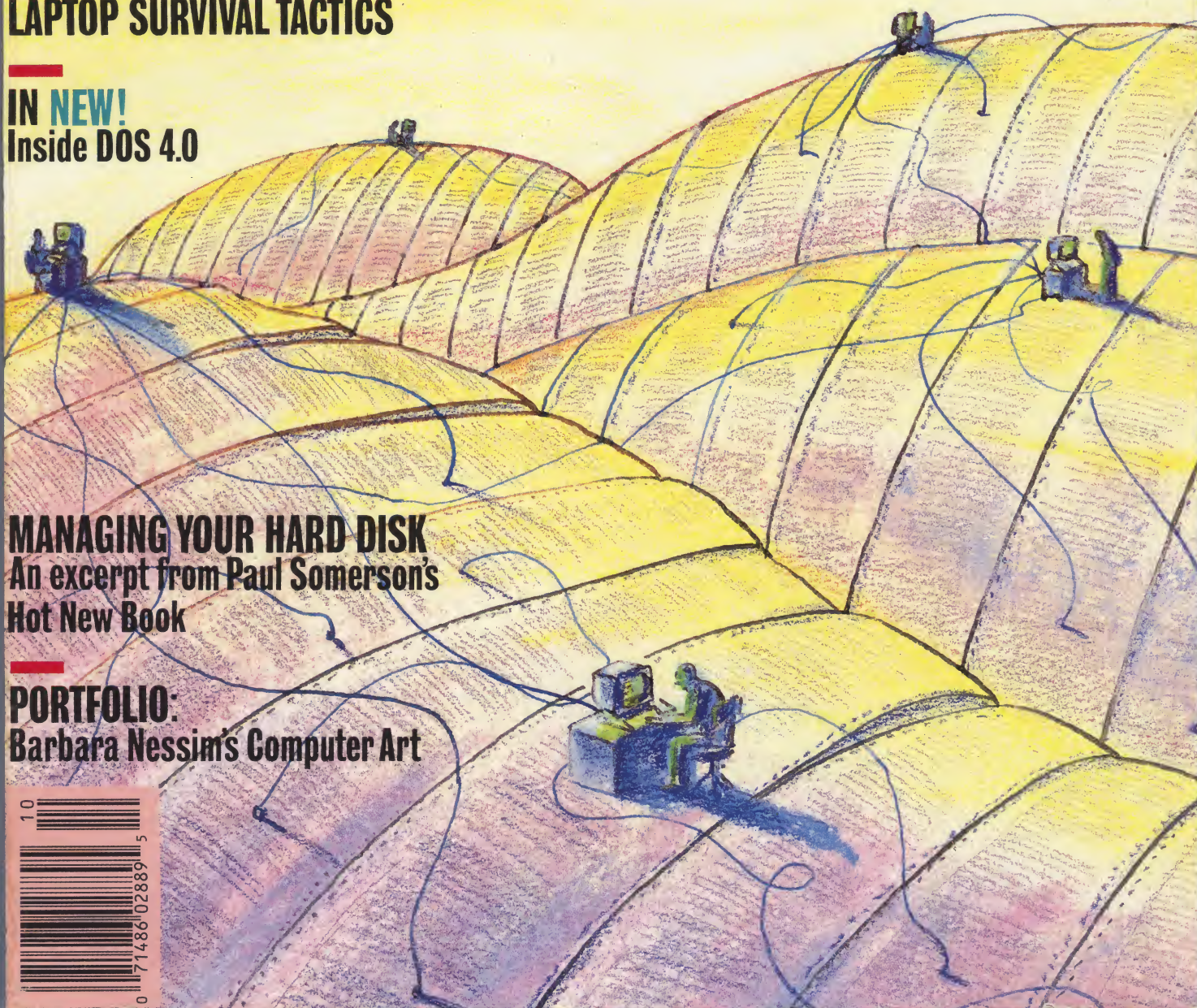


PCcomputing

AMERICA'S COMPUTING MAGAZINE

The Electronic Workgroup

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"The Dell System 220 runs most PC Labs system benchmark tests at speeds that would make you think you're running a 386."

—PC MAGAZINE

"...the System 220 has more going for it than just speed."

—PC WORLD

"...includes a year's on-site support...in the price of the computer. This is the sweetest support deal offered by any computer vendor in the industry."

—ERIC KNORR, PC WORLD

"The hot item from a technical point of view is the System 220. This machine runs a 286 processor at 20 MHz, which is its major claim to fame."

—WILL FASTIE, PC WEEK

"...the Dell machine is renewed evidence that the price of 286-based desktop equipment continues to drop rapidly, making such machines very attractive for daily work under MS-DOS even as they hold out the promise of running OS/2 in the future."

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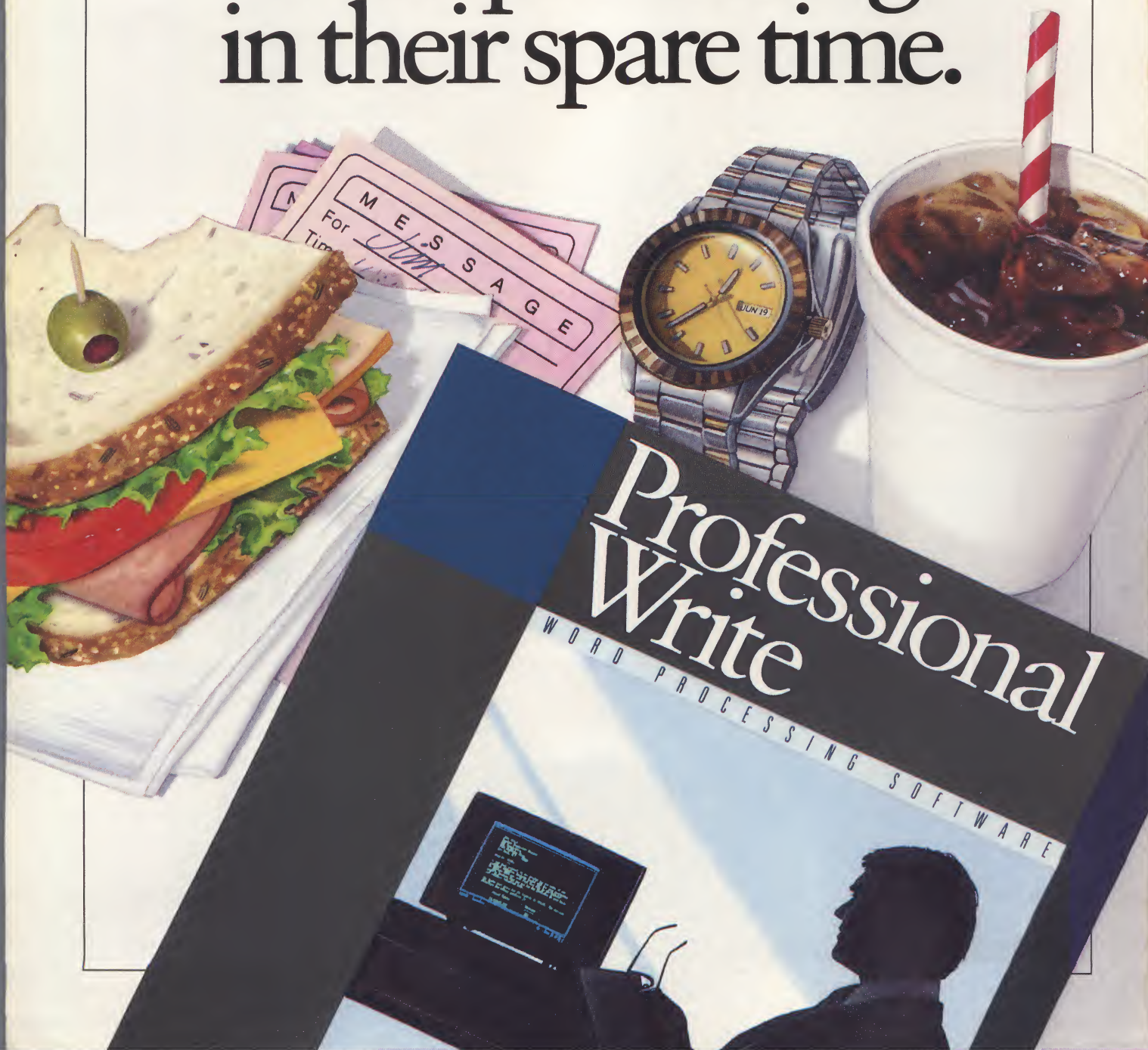
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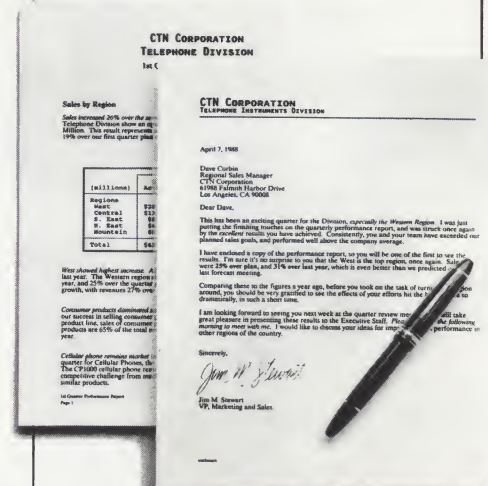
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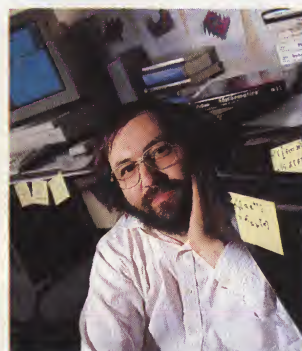
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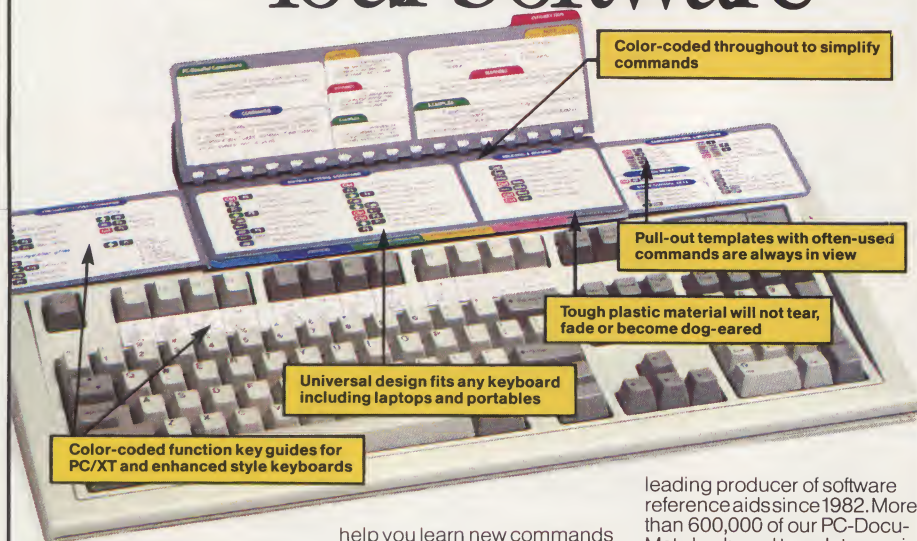
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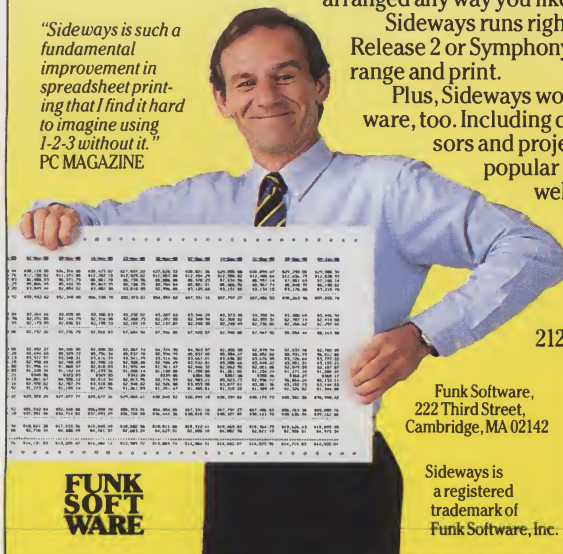
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However, we can't look up information not at hand, recommend products, or diagnose your computer problems over the phone.

If you buy a product advertised in *PC/Computing*, are dissatisfied, and can't resolve the problem, write (but do not call) Janice Watts, Marketing Department, at 80 Blanchard Rd., Burlington, MA 01803. Include all copies of correspondence.

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How we made the most powerful integrated software a whole lot easier to use.

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We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the word processor now has a spelling checker and text outliner. And how database and communications have been improved.

The bottom line is that Symphony is one high performance package that's made to be opened up.



Lotus Symphony 2.0

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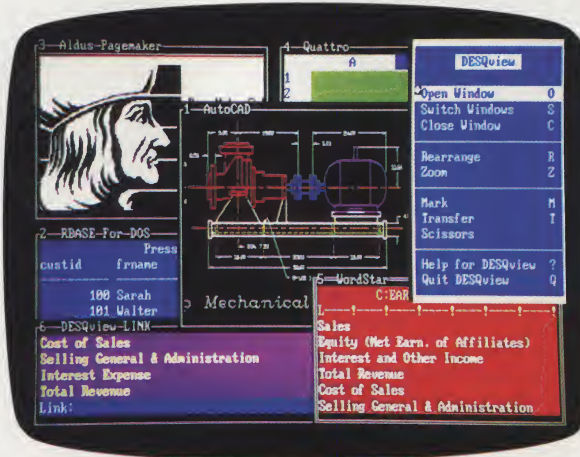
Add DESQview to your PC and it quickly finds your programs and lists them on menus. So you can just point to the program, using keyboard or mouse, to start it up. DESQview knows where that program lives. And what command loads it.

For those who have trouble remembering DOS commands, it adds menus to DOS. It even lets you sort your files and mark specific files to be copied, backed-up, or deleted—all without having to leave the program you're in.

Best of all, DESQview accomplishes all this with a substantial speed advantage over any alternative environment.

Multitask beyond 640K.

When you want to use several programs together, you don't have to leave your current program. Just open the next program. View your programs in windows or



For programmers, DESQview's API, with its strengths in inter-task communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.

full screen. Open more programs than you have memory for. And multitask them. In

640K. Or if you own a special EMS 4.0 or EEMS memory board, or a 386 PC, DESQview lets you break through the DOS 640K barrier for multitasking. If you have other non-EMS memory expansion products like AST's Advantage or the IBM® Memory Expansion Option, we have a

solution for you, too. The ALL CHARGE-CARD™ 'unifies' all your memory to provide up to 16 megabytes of continuous workspace. DESQview lets you use this memory to enhance your productivity. You can start 1-2-3 calculating and tell Paradox to print mailing

labels while you're writing a report in Word Perfect, or laying out a newsletter in Ventura Publisher, or designing a building in AutoCAD.

DESQview even lets you transfer text, numbers, and fields of information between programs.

Fulfill the 386 promise.

For 8086 PC users, DESQview becomes a 386 control program when used in conjunction with Quarterdeck's Expanded Memory Manager (QEMM)-386—giving faster multitasking as well as virtual windowing support.

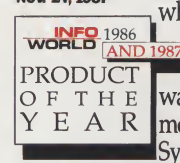
And when you use DESQview on an IBM PS/2™ Model 50 or 60 with QEMM-50/60 and the IBM Memory Expansion Option, DESQview gives you multitasking beyond 640K.

Experts are voting for DESQview. And over a million users, too.

If all of this sounds like promises you've been hearing for future systems, then you can understand why over a million users have chosen DESQview. And why PC Magazine gave DESQview its Editor's Choice Award for "The Best Alternative to OS/2," why readers of InfoWorld twice voted DESQview "Product of the Year"

why, by popular vote at Comdex Fall for two years in a row, DESQview was voted "Best PC Environment" in PC Tech Journal's Systems Builder Contest.

DESQview lets you have it all now.



DESQVIEW SYSTEM REQUIREMENTS:
IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2* Memory: 640K recommended; for DESQview itself 0-145K* Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards* Disk: two diskette drives or one diskette drive and a hard disk* Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA), IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA)* Mouse (Optional): Mouse Systems, Microsoft and compatibles* Modem for Auto-Dialer (Optional): Hayes or compatible* Operating System: PC-DOS 2.0-3.3; MS-DOS 2.0-3.2* Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.03, GEM 1.1-3.0, IBM TopView 1.1* Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

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	ALL CHARGE CARD (Special for DESQview owners)			\$200.00*
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*This ALL CHARGE CARD is designed for the IBM PC AT and PS/2 50 and 60. If you have another type of 80286-based PC, there's a version for you, too. Please call 1-(800) 387-2744 for special ordering information. Offer expires August 31, 1988. Trademarks are property of their respective holders: IBM, OS/2, PS/2, 1-2-3, Paradox, Word Perfect, Ventura Publisher, AutoCAD, Intel, Above Board, AST, RAMpage, Advantage, Hercules, Mouse Systems, Hayes, Microsoft, Windows, TopView.

CIRCLE NO. 149 ON READER SERVICE CARD.

PERSPECTIVE

As winter approaches in this fifth annual Year of the Network, conversations about workgroup productivity and groupware are heating up again. There's bound to be more talk than action, though, because of one simple fact: most groupware vendors are ill equipped to sell, and most groupware purchasers are ill equipped to buy.

As challenging as standalone products are to purchase and adopt, groupware is incalculably tougher. The sociological barriers to workgroup computing are just as high as the technical barriers. As long as we attack the adoption process one-dimensionally, our paths will be strewn with failure.

In their book *Re-inventing the Corporation*, John Naisbitt and Patricia Aburdene show how top-down management is yielding to a networking style, "where people learn from one another horizontally, where everyone is a resource for everyone else, and where each person gets support and assistance from many different directions."

If the benefits are so obvious, why is there so much disappointment?

Groupware projects frequently run into trouble right up front. They're critically sensitive to who initiates them, for what reasons, how they're funded, and how they're rolled out.

The best computer systems are inspired and led by a champion—a high-placed manager or contributor who can link objectives and strategy to system choice and design. That's doubly true



with group productivity products.

A champion must be savvy, not only about what makes an organization successful but also about the formal and informal communications devices that groupware

must emulate. A vision of the organization's needs must drive the effort. A champion must confront a critical choice: will groupware change how a group operates, or will it merely streamline existing communications?

Few data processing professionals can make such choices alone. Even fewer can be successful, without help, in the vital day-by-day selling, co-opting, hand-holding, adjusting. It's a trying exercise in group psychology.

Groupware vendors aren't helping much by focusing on technical issues: features, specifications, and topology.

PC-savvy executives and managers—including many *PC/Computing* readers—must lead the way toward the effective use of groupware tools. That's why this month's cover story tackles the issues of group productivity.

We must seek and promote congruence among technical capabilities, group dynamics, and business strategy, lest in four years we anticipate the tenth annual Year of the Network.

MICHAEL E. KOLOWICH
Publisher

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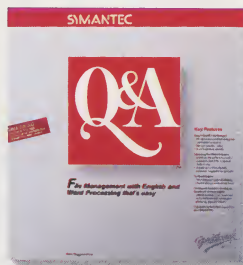
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E O R G A S



A while ago, the *Wall Street Journal* ran a story telling of Southern California Edison's attempt to make a software "clone" of Thomas Kelly, a civil engineer who specializes in the construction and maintenance of dams and has spent 20 years studying and coddling the Vermilion Dam in the Sierra Nevada.

Kelly is 55, and that poses a problem for Edison. When he retires, what will happen to the mine of information he has gained through his years of experience? Who will be keeper of the knowledge of Vermilion's quirks? Who will remember what happened at the dam 15 years ago, and use that memory to solve new problems? Recognizing the scope and importance of Kelly's knowledge, the company's management turned to technology for help.

Edison—and Kelly—agreed to work with expert-systems specialists from Texas Instruments to create a computer system that would mimic Kelly's thought processes and give less experienced engineers the benefit of his decades of work. For two years, Kelly obliged the two "knowledge engineers" dispatched by TI. He answered endless questions about earth and gravel, water pressure and seepage, blocked drains and vegetation, and submitted to the programmers' efforts to reduce his reasoning to a series of if... then statements and what-if hypotheses.

But synthesizing Kelly's reasoning processes turned out to be a lot harder than anyone expected, and the effort became frustrating. How to re-create the instinct and intuition that come from touching the ground around a dam, feeling dampness, and relating that to a problem deep inside the structure? The knowledge engineers began to see that while it was possible to create a system capable of dealing with rudimentary problems and providing generalized solutions, it was impossible to duplicate "gut feel," or even to know when science takes a back seat and instinct kicks in. The project was dropped, the knowledge engineers moved on, and Edison is hoping Kelly won't take early retirement.

The Kelly expert-system project was by no means a total

flop: Edison now has a limited diagnostic system that its engineers can tap to deal with some basic problems. But the company estimates it would take another \$100,000—and who knows how much additional time—to make the thing truly useful. And, says the *Journal*, as long as Kelly is around, no one is much interested in resorting to a machine to get the answers Kelly himself can provide.

Expert systems and artificial intelligence are wonderful, seductive concepts and fields of study. There's an Everest-like challenge in creating a program that "thinks," and when we finally understand enough about the human mind to create such a system, the gains realized could be enormous.

But the Kelly project and others like it miss one crucial point: along with our efforts to clone expert knowledge in computer software, we need to devote equal attention to passing our knowledge from person to person, with the PC serving as a tool, not as a middleman.

How come Kelly is the sole repository of decades of data, experience, and essential information? Where are his apprentices, his backup? If management thinks his expertise is important enough to back up with computers, why on earth isn't it worth investing some human resources and attention in the problem?

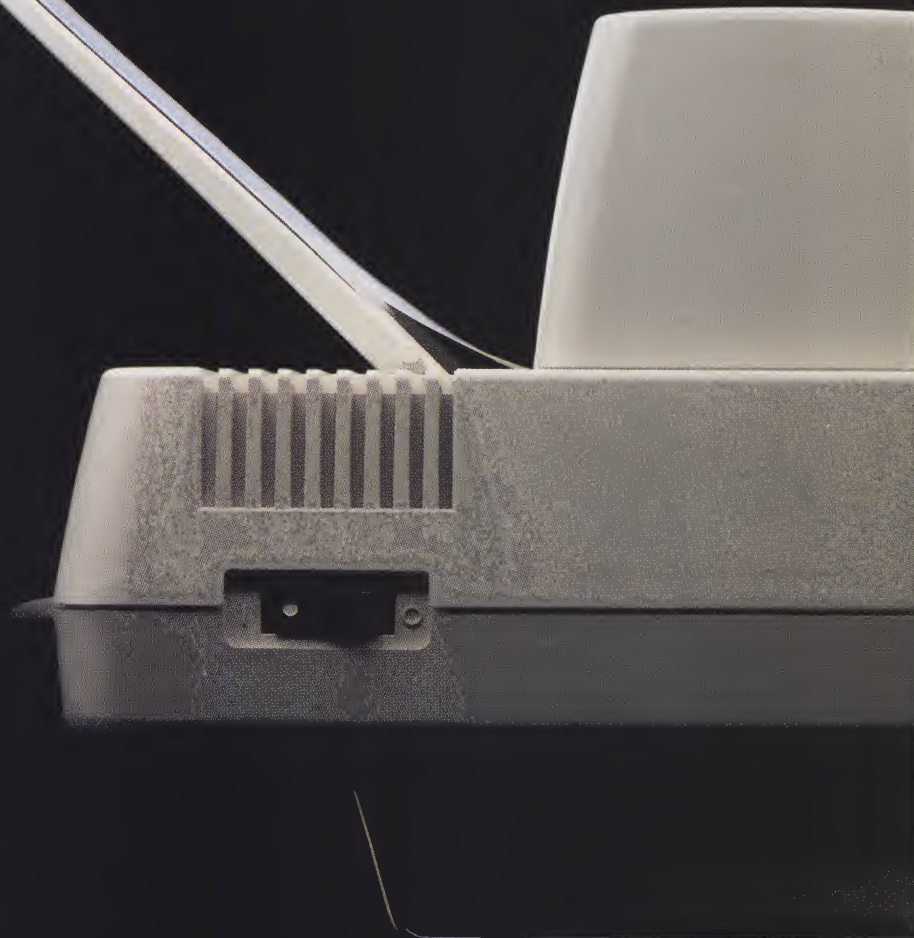
By all means, let's continue to push for that ideal computer system that *will* factor instinct and intuition into its calculations and decisions. Push hard enough, and we might end up with terrific tools to teach people the reasoning processes that form the core of so many professions and jobs. PCs have a vital role to play in passing along expert knowledge and making the jobs themselves easier to perform.

In the meantime, let's make sure the Kellys of business don't slip away. ■

Nora Georgas

EDITOR

PHOTOGRAPH BY RUVEN AFANADOR



THIS IS WHAT HAP LET OUR CUSTOMERS

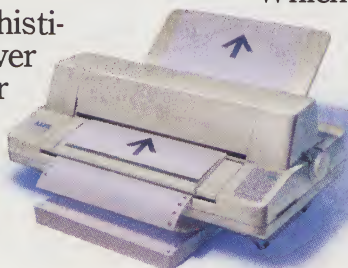
This is not exactly your typical dot matrix printer. But then, the new ALPS Allegro 24 wasn't built in typical dot matrix printer fashion.

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N

NEAR

L

LETTER

Q

QUALITY

Praise for Debunkers

Your premiere issue is impressive: thoughtful, timely, informative, and literate, the last being somewhat of a rare commodity in the aphasic world of computer magazines. Congratulations especially for including intelligent debunkers like Edward Tufte ("The Power of Graphics"). I wonder somewhat about the magazine trying to be all things to all readers (six columns and eleven departments, including one for kids?), but wish you only the best in finding your audience.

Larry L. Constantine
Acton, Massachusetts

WOW! What more can I say?

Mark Coker
Coker Electronics
San Mateo, California

DOS Post-Mortem

The article "Is DOS Dead?" left me curious. Is Digital Research's Concurrent DOS dead, too? Seems to me it is finally gaining wide acceptance after years of refinement. Why the scrupulous avoidance of this very powerful product?

Bill Copenhagen
Richmond, California

Our office relies heavily on a multiuser, multitasking MS-DOS-compatible operating system, PC-MOS-386, that Dvorak has pooh-poohed for some time. Yet this is the direction that many small corporations are going with to add power to their old software. MS-DOS alone is fading away. OS/2 is a myth. But the people are turning to multiuser DOS systems anyway—regardless of the desperation of Dvorak.

Reilly Burke
Point Roberts, Washington

On a Rail

As a charter subscriber, I was very anxious to read the premiere issue of PC/

Computing. My enthusiasm was dampened, however, by the frightening photograph on page 103 of Paul Theroux sitting foolishly in the center of a railroad track.

The railroad industry has invested a considerable amount of time and money to educate the general public on the dangers of trespassing on railroad property. Safety is given a high priority by railroads. This photo does a real disservice not only to your readers but to the rail industry as well.

Gary R. Jones
Manager, Corporate Communications
Grand Trunk Western Railroad
Detroit, Michigan

Electrifying Read

I received my premiere issue of your magazine and was very impressed. However, I would like to point out that the cover was loaded with static electricity. I was reluctant to place it anywhere near my computer.

T.D. Kueffer
Orange, California

All in the Family

I am a subscriber to PC Magazine, which I rely on for reviews of hardware and software. I notice that both that magazine and PC/Computing come from the same parent company. Am I receiving two magazines which have the same objective? Should I keep just one subscription? Give me your honest opinion.

Rey Santos
Panorama City, California

While PC/Computing and PC Magazine both come from the Ziff-Davis Publishing Company, that's about all they have in common. We believe PC Magazine does the best job out there of providing reviews of hardware and software. But at PC/Computing we believe there's more to computing—and to life—than hardware and software. We know how important

personal computers have become in the life of America—professional life, personal life, family life. We want to make PC/Computing reflect the breadth of this involvement with PCs. That's why we call it America's Computing Magazine.—Ed.

Hard-Core Software

I do not mean to preach at you, but the advertising of "adult" software seems quite unnecessary to me and beneath the standards of a national magazine. I would urge you to eliminate such ads from your publication, for the good of all of us.

Charles D. Emerson
Charlottesville, Virginia

I was very surprised and offended when I noticed the California Freeware advertisement for pornography in your first issue. I did not expect this kind of advertisement in a serious computing magazine.

Silvia Ator
West Wilmington, Connecticut

PC/Computing is a serious publication. And we take our relationship with our readers seriously. Such advertising will not appear in future issues.—Ed.

Hobbitlike Writers

"IBM vs. Apple" was misleading and biased. Referring to Mac users as "working without ostensible reason or method," and calling the Macintosh a "hobbitlike creature that crouches on the desktop" using a "private vocabulary of corny pictures" can only be construed as one person's narrow-minded view—and should be clearly identified as such.

Howard McCleskey
Victoria, Texas

The Mystery Ctrl-Z

In Van Wolverton's DOS article ("Unraveling the Mysteries"), I was surprised to read—in two separate para-

	1986	1987	1988
Asset Exchanges (Note E)	\$28,500	\$17,598	
Improvements	\$184,576	\$176,549	\$87,645
Installations (Note F)	\$4,500	\$17,500	
Additions to fixed assets	\$109,076	\$212,593	\$105,243

Statement of Income		1988
Income from operations	\$1,193,975	
Interest and dividends	\$76,433	
Income before income taxes	\$1,270,408	
Provision for income taxes	\$472,608	
Net income	\$797,800	
Earnings per share	\$1.12	

At Cost		1988
Land	\$258,087	
Buildings	\$678,930	\$44,979
Fixtures	\$72,844	\$10,486
Machinery	\$261,456	\$22,381
Other equipment	\$13,465	\$6,480
Furniture	\$47,564	\$6,794
Vehicle	\$47,609	\$11,922
Tenants	\$30,738	\$7,480

For Year Ended December 31st		B 1986	C 1987	D 1988
Sources of working capital:				
Net income		\$276,977	\$682,094	\$790,400
Non-fund charges to income:				
Deferred income taxes		\$32,872	(\$37,568)	
Depreciation and amortization		\$79,832	\$96,267	\$105,246
Working capital from operations		\$389,681	\$748,793	\$903,654
Sale of fixed assets		\$68,476	\$74,867	\$37,699
Issuance of common stock		\$7,044	\$43,438	\$34,866
Issuance of preferred stock		\$517,000		
Total sources		\$982,201	\$859,898	\$976,219
Uses of working capital:				
Additions to fixed assets		\$189,876	\$222,549	\$185,243
Additions to other assets		\$106,834	\$66,919	\$125,639
Dividends paid on capital stock		\$38,764	\$89,523	\$117,690
Total Uses		\$254,674	\$378,991	\$348,572
Increase in working capital		\$727,527	\$480,107	\$627,647

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Sources of working capital:				
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Non-fund charges to income:				
Deferred income taxes		\$32,872	(\$37,568)	
Depreciation and amortization		\$79,832	\$96,267	\$105,246
Working capital from operations		\$389,681	\$740,793	\$903,654
Sale of fixed assets	1	\$69,476	\$74,867	\$37,699
Issuance of common stock	2	\$7,044	\$43,430	\$34,866
Issuance of preferred stock	3	\$517,000		
Total sources	4	\$982,201	\$859,698	<u>\$976,219</u>
Uses of working capital:				
Additions to fixed assets	1	\$189,876	\$222,549	\$105,243
Additions to other assets	2	\$106,834	\$66,919	\$125,639
Dividends paid on capital	3	\$38,764	\$89,523	\$117,690
Total Uses	4	\$254,674	\$378,991	<u>\$348,572</u>
Increase in working capital		\$727,527	\$480,107	<u>\$627,647</u>

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Sales	\$1,150,162	\$4,530,466	507,888
Cash	\$21,929,963	\$36,418,464	132,727,897
Hardware	\$28,913,431	\$8,355,814	521,961
Lawn & Garden	\$3,784,621	\$5,929,450	127,888
Lighting	\$1,466,185	\$836,393	671,389
Office	\$6,465,617	\$5,613,023	935,000
Outdoor Living	\$2,321,777	\$1,514,582	
Pet Care	\$808,822	\$124,260	690,000
Sporting Goods	\$9,893,360	\$4,862,833	
Total	\$132,879,539	\$148,469,082	

regional sales worksheets to produce a national consolidation.

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graphs—that Ctrl-Z tells DOS to clear the screen! I'd like to know which version of DOS does this. In my experience, CLS tells DOS to clear the screen, whereas Ctrl-Z documents the end of a file, telling DOS to finish copying it to its destination.

Steve Offner
Carlsbad, New Mexico

Indeed, CLS will clear your screen. Ctrl-Z ends a file.—Ed.

What is Fastopen? Mr. Wolverton just sort of throws it into his article on Autoexec.bat files as if we all knew about Fastopen. What is it? Where is it?

Jay Gerhard
Boca Raton, Florida

The Fastopen command, new in DOS 3.3, reduces the time required to open frequently used files stored on hard disks. It works by holding the location of directories and recently used files in the computer's memory. With the location in memory, no disk search time is needed to find it, and the file opens faster, hence the name.—Ed.

I learned more in five minutes from "DOS: Unraveling the Mysteries" than from months of reading the IBM DOS reference.

C.M. Katterjohn
Skyland, North Carolina

Literary Criticism

"Gandalf and Blade" was incredibly realistic and believable and kept my attention until the end. I must admit that I even shed a tear—something unheard of for a computing magazine article. Glad to see that PC/Computing won't be just another technological reference.

Michael J.D. Sutton
Scarborough, Ontario

The editorial decision to put a smarmy short story ("Gandalf and Blade") in a magazine that was touted as "something new for the power user out there" will not endear this publication to anyone who actually buys and uses computing machinery or software.

David M. Wilson
Bucyrus, Ohio

Time's Man

"A Man for All Time" had great potential, but Charles Fox chose to delve into inane metaphysical questions instead of finding out the specifics of how computer enhancements have made Ste-

phen Hawking's life more productive.

Taylor Sherrill
Tucson, Arizona

Charles Fox's piece on Stephen Hawking was a winner—worth the price of the magazine. I have read many articles about millionaires and successful hackers. But seldom have I read about how the computer has helped the disabled. I hope you have more such stories.

Samuel J.R. Smith
Watsonstown, Pennsylvania

I was quite interested in "A Man for All Time," as I also have the handicap of being speech impaired. Could you tell me where to get information on the speech synthesizer Hawking uses, the Speech Plus?

Allan R. Summers
Pasadena, Texas

Speech Plus, the maker of the synthesizer, is located at 640 Clyde Court, P.O. Box 7461, Mountain View, Calif. 94043-7461; phone (415) 964-7023. The Equalizer software to drive hardware such as the Speech Plus product or software voice-synthesis programs is the product of Words Plus, P.O. Box 1229, Lancaster, Calif. 93534; phone (805) 949-8331.

Design Considerations

Your layouts, fonts, colors, and graphics fall into the category of visual assault and battery. It looks as if a neophyte with a new desktop publishing package designed your magazine with the mentality of "I paid for all those fonts and color monitor bit planes and I'm jolly well going to use them—all at the same time."

Kenneth L. d'Entremont
Columbia, Missouri

Let me congratulate you on the graphic design and layout of the magazine. Your use of type styles, graphics, and pictures brings the dry subject of computers into a refreshing appearance. Most readers page through the "usual" computer magazines once, giving a cursory glance to both ads and articles. As I sat down with PC/Computing, the artwork immediately drew me into the articles and I totally forgot about the ads (which I read on a second perusal).

Jennifer E. Symens
Beaverton, Oregon

Shot in the Foot

In "Ready, Aim" you refer to "Uzi-packing PC users." The two rifles

shown in the photographs are a Cold M-16/AR15 type and an AK. I will grant you that at that particular firing range, as at other places, Uzis are probably common. But if your magazine printed a picture of three IBM-type computers and referred to them as Apples, surely various users and manufacturers would be upset. When you run items outside of your expertise, please check around.

Christopher G. Mees
Midland, Texas

You're absolutely right. We should have double-checked our hardware.—Ed.

Sexist Odyssey

Paul Theroux really ticked me off with the introduction to his article, "Laptop Odyssey." I don't need any references to topless (female, naturally) bathing beauties, or other voyeuristic sexual tripe. Computing is too much of a boys' club as it is without slipping that kind of stuff in.

John Pollack
Omaha, Nebraska

Cultural Revolution

Jeffrey Bairstow shocks me. To hear a fellow XyWrite user advocate standard function-key definitions and keyboards that are uniform! Bairstow's discomfort shows how our psyche gets thrashed about during cultural transitions.

Humans have limited random access memory, with a certain amount of room for TSRs (tacit skills resident). History shows that we are frequently required to reallocate personal memory space to install new TSRs. Sometimes we experience crashes from the new memory demands. We have to keep trying to load new skills—such as keyboard customization—until we hit upon a workable combination.

Michael Heim
Redondo Beach, California

Revenge on the Nerds

For too long, the computer magazine industry has perpetuated the image of computer users being techno-nerds. It is a joy to finally have a magazine that addresses not only the technical side of computing, but the human side too. The interview with Stephen Hawking, the Portfolio, and "Gandalf and Blade" were well done and interesting to read: fine examples of the often overlooked aesthetic side of computers.

Bruce L. Brown
Piqua, Ohio



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V O R A K

Thirty-nine-year-old Will Hearst III probably knows more about technology than any other guy in the newspaper business. His mathematics degree (from Harvard) and his love of computers make him better suited to running IBM than the *San Francisco Examiner*. Nonetheless, he's headed toward some cushy executive spot at the multibillion-dollar, privately held Hearst Corporation. As publisher of the *Exam*, Hearst gets to hobnob with politicians and power mavens, and the fast pace of it all holds some attraction. Then again, how would I know?

We were at the Square One Restaurant in San Francisco. I was trying to get him to upgrade my compensation for some columns I do for the *Examiner*, and, as usual, he changed the subject to computers. And, as usual, I was hard pressed to stick to my own agenda.

This was especially true when he said he knew what Steve Jobs of NeXT, Inc., was up to. Jobs was still mum about his new project, so I was all ears.

"It's called the Learning Cube," Hearst began. "The key is its self-contained VCR mechanism, or video input, depending on the model. The system uses real-time video combined with genlock capability, so a student can receive a lesson on videotape. The computer controls the tape and interacts with the user. You do your homework, then bring the disk to class. Jobs figures this will be the homework medium of the future. Tests and everything can be done that way."



I had never heard this story before, but it was an interesting idea. Hearst flagged down the owner of Square One, Joyce Goldstein, and began to grill her about the wine list. He was especially

interested in Pinot Noir and French Burgundy—foppish wines by my standards—but Goldstein seemed unhelpful in this pursuit. We settled for an inconsequential Bordeaux, and Hearst continued his tale.

"It's the future of learning," he said.

When Hearst told me he knew what Steve Jobs was up to, I forgot all about the money.

"Jobs knows that soon we will realize that learning will not stop after college. We have too much to learn. We can't stop formal education at age 22 or so. It has to go on during our working years. Forever, actually. Much of it will happen through corporations. Like those seminars that give credit for a day listening to a guy talk about marketing. Imagine if corporations offered degrees with their jobs to lure employees."

Just then some passing glad-hander said hi to Hearst. Something about "doing lunch."

The waiter showed up and took our orders. By now I had forgotten the reason for this meeting. Hearst continued his spiel.

"Steve Jobs hopes that part of the formula will include the Learning

Cube. Each employee gets one to take home. Each night some homework is done. A floppy is turned in each week and processed by a central computer. The student's course work is customized by a computer, based on performance. It's the future of education."

"That's amazing," I said. "It's so obvious, too. How did you find out about all this?"

"I made it up. I have no idea what Jobs is doing. I figure that this is what he *should* be doing. If he's not doing it, then someone else should do it," said Hearst as he bit into a piece of sourdough bread.

I had listened for nearly an hour as Hearst detailed the imaginary machine. It seemed unlikely that Jobs's vision could be as complete as Hearst's. My mundane *Examiner* columns paled in comparison with this grand view of the future of education.

Nonetheless, I awkwardly changed the subject. "Well, you know we have to talk about the columns," I said.

Hearst patted his lips, casually tossed his napkin onto the table, and began to rise. "Yes, we have to talk about it. Call Margaret and set something up. I'm on vacation this week. I'm out of here. Catch the bill. I gotta go."

He raced off as the check arrived. As I looked at the bill, I realized that perhaps Hearst *does* belong in the newspaper business after all. ■

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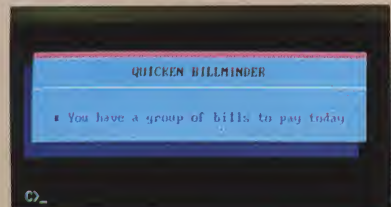
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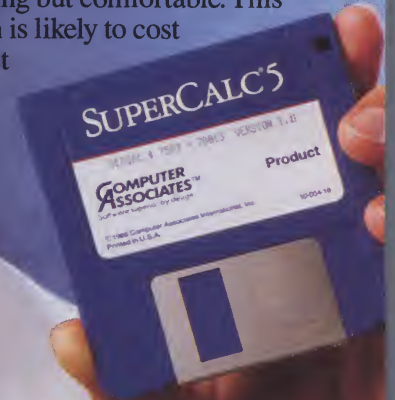
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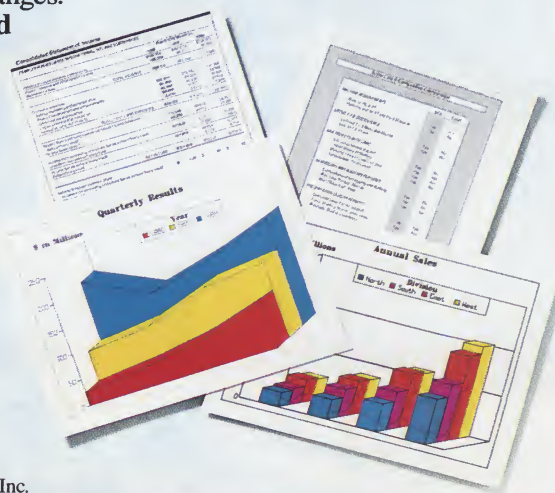
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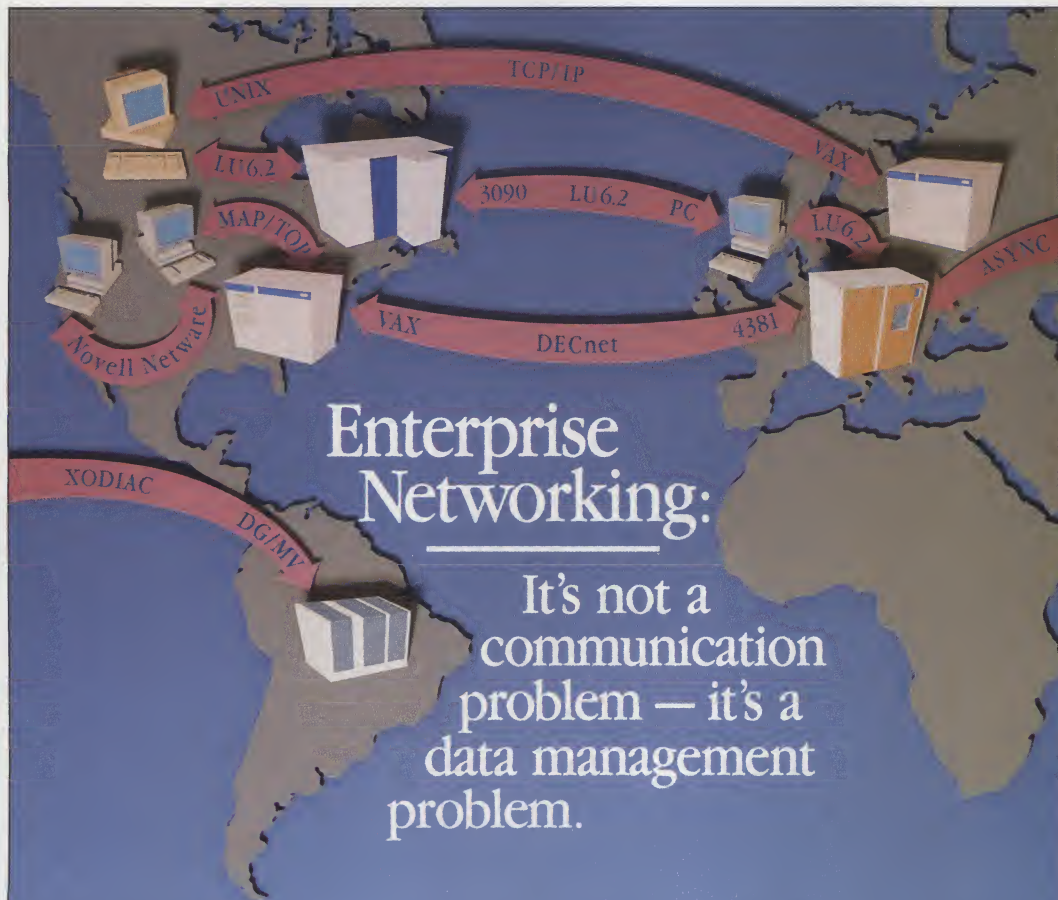
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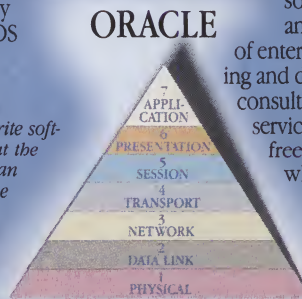
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PCCOMPUT

D Y S O N



Consider this classic joke: "Ready! Fire! Aim!" Fundamentally, it's a joke about sequence—about doing things in the wrong order. It's not a joke a computer could understand, but it's one that a computer can easily represent—without bit-map displays, fancy software, or any of the stunning graphics systems I saw in August at SIGGRAPH, the annual festival for graphics zealots.

In fact, there's a whole world of graphics and graphical thinking outside the ray-tracing, constraint-based modeling, and 3-D animation that informed SIGGRAPH. This other world is based on the notion of structure and sequence, as opposed to image. (To be sure, constraint-based modeling depends on underlying structures, but its goal is to create images for people to see.) Graphical structures can display concepts and relationships, as opposed to scientific visualization—a hot topic right now—which is about using graphics to display data.

Such structural information comes through clearly on a plain old text PC, starting with the lowly outline. Any item's place in an outline—three indentations to the right, five sections down—indicates its relationship to the other items. Or take something as simple as a pro-con chart: the mere placement of an item on one side or other of the page (screen) says it all.

Think of the meanings you can express with graphics. Arrows can show cause and effect, the sources of any-

thing (advice, raw materials), or the transfer of property. You can represent the timing of events far better with a PERT or Gantt chart than with words: you can see how all the

events are related, in time and precedence, and which ones occur simultaneously without being related. My own family structure, with four parents and numerous step-people, is best rendered with a diagram (or left discreetly unexplained). Want to describe a market?

more means a complex image and muddy thinking.)

Sequence indicates time: that's the principle behind the ready-fire-aim joke. Have you ever seen a time line that began with the future to the left? (Perhaps in Israel, where they read from right to left.) PERT charts, Gantt charts, and histograms add arrows to indicate flows of information, cause-and-effect relationships, and the like.

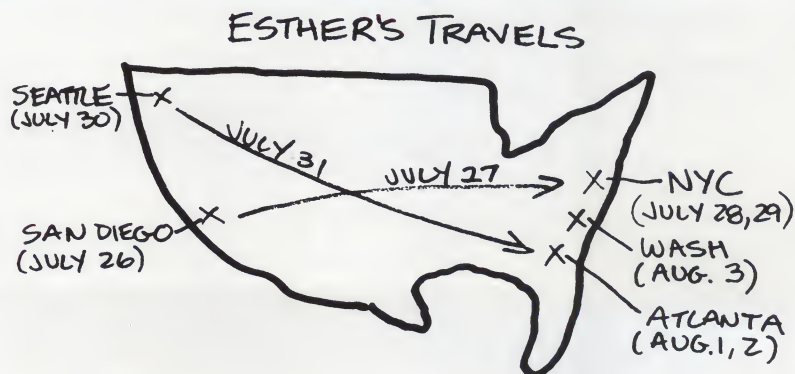
But time can also be relegated to the text of a chart, as in Minard's depiction of Napoleon's retreat from Moscow, discussed by Ed Tufte in the August issue—or in charting my own recent ad-

Some relationships are just too complex for words. That's where graphical thinking comes in.

Probably the best way is to draw a grid, with different shadings for the different players. (So far the best we can do is generally two axes, but that's usually enough for the basic point. Anything

ventures, as seen on the map below.

Organization charts are another example of graphical structure, showing relationships among data (which could be the components of a task or project,



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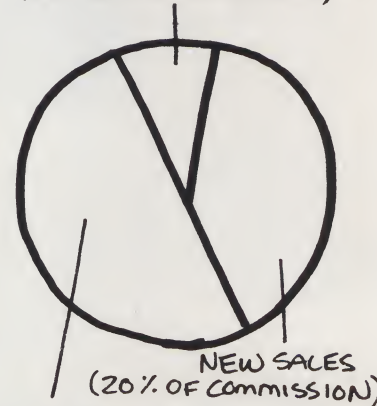
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DYSON

a "work breakdown," or tangible things). An org chart, of course, is nothing but an outline—a hierarchical structure—in different form.

And then there's the chart of Sally Tation's mind (she sells software for Computer Comfort):

CURRENT CUSTOMERS
(80% OF COMMISSION)



LUNCH
(80% DEDUCTIBLE)

The wonderful thing about this stuff is that it's meaningful to the computer, too. You can give a computer very simple data and have it generate the displays or, with a variety of new CASE and diagramming tools, create the images and have it understand (and perhaps validate) the relationships they express. It won't get the jokes, of course, but it will get their literal meanings.

In short, the real value of graphical thinking is not that you can use a bit map of a trash can to represent deletion but that you can use a sequence of arrows and objects to represent a sequence of actions or a series of relationships that is too complex to express easily in words.

The questions that interest me now are: Do people naturally think this way? Will they immediately start thinking graphically once they have the tools to do so? Or do only some of us think visually, while others think in words? Some people like directions that are procedural instructions: turn left at Kendall Square, go three blocks, turn right into the quadrangle. Others prefer maps: it's two blocks north of Ashby, one block west of Shattuck.

Myself, I rarely draw, because my efforts are so clumsy. But I'd love to use a tool that made it easy. As it is, I rarely use slides, but I always talk with my hands. ■

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Voted one of "The Best Of The Best Utilities" by *PC Magazine*, PopDrop is one program you shouldn't be without.

PopDrop Divides Your RAM Into "Layers"

PopDrop works by dividing your memory into layers (up to 16) each of which may contain several programs. After loading DOS and your permanent programs, RAM-resident programs are loaded with these layers between them, the most permanent at the bottom, the least permanent at the top. You can create batch files to remove layers one at a time or several at once.

And PopDrop Is Amazingly Memory-Efficient

Other products gobble up to 40K of your precious memory. PopDrop provides unmatched power and flexibility and occupies only 0.6K for the first layer, and 0.2K for additional layers.

PopDrop features a remarkable animated disk tutorial that illustrates how PopDrop works and how to use it most effectively.

Control Your RAM Instead Of Letting It Control You

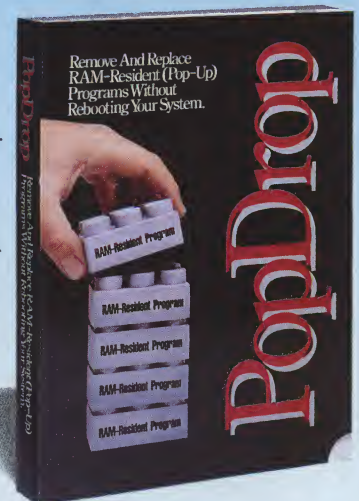
For example, if you want to run a RAM disk, a print spooler and one or more pop-up programs most of the time, but need them out of the way to work on a large spreadsheet, you can do it easily with PopDrop. If you need different programs resident when you switch to another application—it's no problem. In fact, you can easily use PopDrop in your batch files to make this automatic.

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SOMERSON

PAUL



We've all been steeped in computing lore, from ENIAC to Wozniak. And we all giggle at the old technology: looking back at the earliest computers is like peering through the Palomar telescope from the wrong end. Even *refrigerators* these days are smarter than ancient mainframes. It's quite a leap from the grunting, room-sized clunkers of yore to our compact world of terabytes and gigaflops.

A slender volume that chronicles the history of computers recently appeared on my desk. This homey little book, *The Computer Story*, by Irving E. Fang, Ph.D. (Rada Press, 2297 Folwell Ave., St. Paul, Minn. 55108, \$9.95), is a well-spring of computer esoterica.

Not merely content with transistors, electron tubes, and telephone company relays, Fang takes us back much further, to Chinese bone scratchers and lines scraped in the dirt. From there it's a quick hop to da Vinci's sketchbook, Napier's rods, Leibniz's wheels, Schickard's clock, and the Pascaline—a shoebox-sized forerunner of the odometer. Blaise Pascal whipped it up when he was 19 to help a tax man add figures.

Fang devotes much space to Charles Babbage, whose "analytical engine" presaged the PC. The author points out that Babbage also invented the speedometer, which, along with Pascal's odometer, laid the groundwork for the modern automobile dashboard.

Time moves on. Soon we're introduced to the first computer groupie, Augusta Ada Byron, a.k.a. Lady

Lovelace; then to Jacquard's looms, Herman Hollerith's punched cards, and eventually to George Stibitz's K Model. The K (for *kitchen table*) was the world's "first electric digital calculator"—a handful of crudely soldered, ominous-looking cylinders and wires that resembled something a terrorist might try to slip into carry-on luggage.

On the way up the time line we visit Vannevar Bush's analog computer, a

predicts holds "a robot that helps a disabled person into a bathtub."

Despite the scope of Fang's history, however, he overlooks several important developments. While waxing eloquent about Blaise Pascal's primordial adding machine, for example, he barely touches on the Pascaline clone wars. Similarly, although he reveals that Babbage's calculating machine was to be powered by "six steam engines," he fails to discuss how to convince a stewardess that it will fit under your seat.

When detailing how sledgehammer-wielding Vannevar Bush programmed his 100-ton analog computer, Fang ut-

Irving Fang's history of computers digs up some fascinating facts, but leaves a few stones unturned.

mechanical contraption that—honest—was programmed with a sledgehammer. Then it's off to more familiar territory with Howard Aiken's 55-foot-long, 5-ton Mark I; the John Mauchly/J. Presper Eckert 30-ton decimal-system ENIAC (and their subsequent UNIVAC 1); and the lesser-known John Atanasoff/Clifford Berry ABC binary machine. Before you know it we're drowning in an alphabet soup of EDVAC, MANIAC, SWAC, and MADM.

Fang then steps us neatly past the Turing test, Norbert Wiener's cybernetics, von Neumann's serial architecture, Forrester's magnetic core memory, Kilby and Noyce and the integrated circuit, Ted Hoff and the microprocessor, biochips, Pong, and Seymour Cray, and finally into the future, which he

terly neglects to mention its operating system. HammerDOS? CP/Mallet? And he ignores the revisionist error message of the church-dominated da Vinci period: "Retry, Ignore, Adopt."

Worse, Fang doesn't resolve the most mystifying question of all: How has the same computer biz that attracted da Vinci, Leibniz, Pascal, Napier, Turing, Wiener, and von Neumann ended up with manual writers who probably couldn't find any other job besides biting the heads off live chickens?

Maybe Vannevar Bush had the right idea. There are plenty of times late at night, when my system coughs up a Parity 1 error, or sends data out into the ether, that I'd like to fix the thing with a handheld programming tool from Black & Decker. ■

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CIRCLE NO. 299 ON READER SERVICE CARD.

JIM

SEYMOUR

JOHN C.

D VORAK

VS

I

n a business that loves technobabble, it's easy to mistake "workgroup computing" for the next hot bad idea. Indeed, the temptation is to look twice to see if it hasn't been spelled "WorkGroup computing" to exhibit the PC business's traditional abuse of the English language.

But this one's legit.

And if we misapprehend workgroup computing as just another example of that kind of linguistic and intellectual abuse, we'll lose a conceptual approach to the use of computers in the workplace that is as powerful and important as was the idea of bringing those first, feeble personal computers into the office a decade ago.

PCs are great personal productivity tools. And that's about all we've used them for so far. They make us better and faster typists than anyone with a typewriter, more accurate and more powerful number-crunchers than the green-eyeshade troops with their accountants' analysis pads. They certainly let us look up Mrs. Smithers's account balance faster, draw a better-looking bar chart for the board of directors meeting, or turn out a mass mailing more quickly than we ever did with our old Addressograph or Scripto address plates.

Which counts for a lot in business.

PCs are levers for the mind. But so far we have applied that leverage only to those tasks we do alone, focusing almost entirely on doing them better and faster. We've paid little attention to doing what hasn't been done before, and we've failed to reach beyond the individual's desktop to facilitate interaction with others.

Enter workgroup computing.

Robert F. Kennedy got a lot of mileage out of misquoting George Bernard Shaw's line, which he restated as, "Some men see things as they are, and ask why; I dream things that never were, and ask why not." Let me swipe and recast a little, too: "Some people see PCs as tools for doing more of the same, if better and faster; (continued on page 34)



T

he roots of the American Revolution lay in the decision of King George III to lower taxes on goods imported into the American Colonies. Unfortun-

nately, His Majesty also decided to enforce the collection process. It turned out that the lower taxes, if completely collected, were actually higher than the previously "high" taxes—which had gone largely unpaid, thanks to the nudge-nudge, wink-wink way the colonists did business. A nasty revolu-

tion ensued. The naïve king never knew what hit him and couldn't figure out what the fuss was about.

The same thing will happen to any corporation stupid enough to subscribe to the utopian nonsense promoted by the vendors of workgroup software (or workgroup computing, as Seymour likes to call it)—best described as software intended to help the office drone better plan his day. I define it as the final straw in the never-ending attempt by management to monitor each and every action of each and every employee. With workgroup software, results mean nothing; it's how you spend your time that counts. Keeping logs, maintaining records, and having an open appointment calendar for everyone to see and analyze are the keys to so-called workgroup software. With it we can goose-step into the twenty-first century.

Let's look at this idea by examining the semantics. First off, what the heck is a workgroup, anyway? A team? A group that works together on a single project? So what's workgroup computing as it relates to this group? Something that organizes the group? Something that makes the members of the group work together better? How? By making them spend their day doing nonsense? By trivializing their job so that any complexity is reduced to logging every notion and memo into a machine? What's the point of this time waste? Control, that's the point.

I'm amused by the fact that workgroup software has been renamed by a couple of its (continued on page 34)

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SEYMOUR

I see them as the key to doing new things, and ask why it's taking us so long to understand that."

Now, however, we're starting to see software aimed at helping us to do those shared work tasks characteristic of much of our daily routine. Many things we work on together turn out to be nothing more than the sharing of work currently handled perfectly well with existing PC application programs. Fine: a good e-mail system, capable of accepting binary file transfers, handles that well enough.

But some of the new software packages aimed at the nascent workgroup computing market show a clear understanding of the complexities of shared work. ForComment and The Coordinator, for example (both reviewed in this issue's special report on workgroup computing), show that people have been thinking about the demands of sharing electronic work-products, and, even more, dealing with the work-in-process aspects of shared work.

ForComment is an excellent product, a good example of the kind of automated record-keeping and rich options we ought to demand in workgroup computing software. The Coordinator is a bit stern for my taste, with its demands for stating messages as "requests" and "promises," and its loopy waltz through the "domains of possibilities" in human conversations. But The Coordinator, too, reflects a lot of serious thought about how we share work, and how we make, keep, and breach our commitments to others in shared work settings.

So much for the software. What about the hardware for workgroup computing? That's the easy part: there isn't any. Seen as part of the office "electronic workscape"—how's that for technobabble?—workgroup computing is in effect the conceptual construct, and a hell of a cost justification, for the local area networks corporate America has been installing.

LANs were always a good idea; we just didn't know *how* good till the workgroup computing concept came along. What we've learned is that organizing software-based workgroups is the way to use all that network hardware to support people in their work most immediately and directly.

Far from being just another clumsy buzzphrase, workgroup computing is the metaphor for how we'll be using PCs in business for the next decade. The Decade of the Lone Stranger is over, John.

—JS

DVORAK

proponents with the ugly word "groupware." Notice how the word "work" has disappeared. Disappeared because it isn't relevant. Why don't we just call it controlware or monitorware? At least we'd be honest about it.

The irony of this fascistware is that it's pushed by New Age types as some sort of modern breakthrough in the way we'll be doing work in the future. Nobody ever explains what that break-

This new mechanical boss doesn't care about results. All it's interested in is control.

through is. You just hear platitudes and generalities. "The software defines new ways in which we share work." What's that supposed to mean?

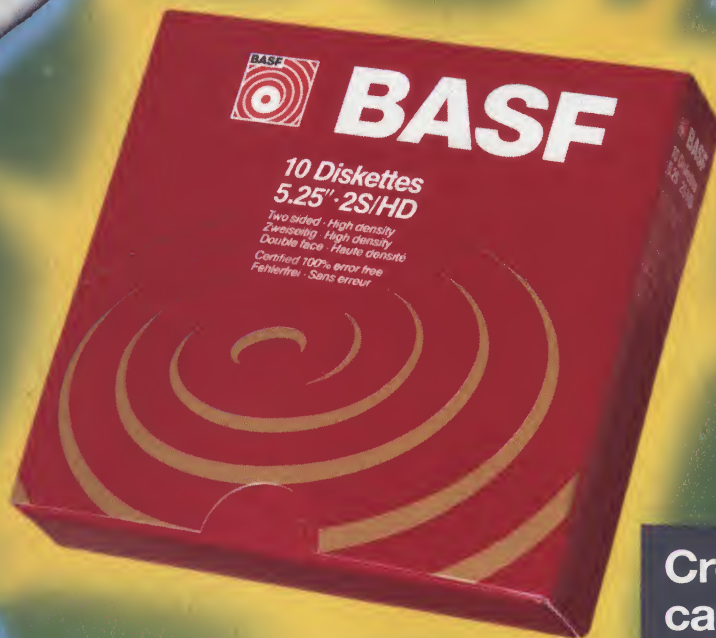
Lost in all this is the notion of leadership. Where is it? In a real workgroup, there is a leader who leads by command, not demand. A guy who does it his way, not the way some remote software programmer thinks it should be done. His way is different from the way the guy across the street does it. The results vary. We learn what works and what doesn't. Progress ensues. This notion is lost on the rigid, blind, mechanical groupware boss who does it one way and one way only.

This new mechanical boss doesn't care about results. It's the old-fashioned return to a preoccupation with control. A return to the days when a guy in a glass cage watched over every move you made. It falls just short of the Nubian slave in the corner, pounding on a drum to get you to speed up your rowing. Groupware turns the computer, our friend until now, into our watchdog. Soon it will be counting our keystrokes and reporting them to some bean-counter over the network. What you can do won't matter; how you spend your time will be the measure of your worth. The classic do-nothing busywork experts in the company will look good, and America will sink a few notches closer to oblivion.

The question that finally comes to mind when I hear about this groupware nonsense is: Whatever happened to job enrichment? It's surely not an element of this New Age software, is it?

Sorry, Jim. I ain't buying into this one. It stinks.

—JCD



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NEW!

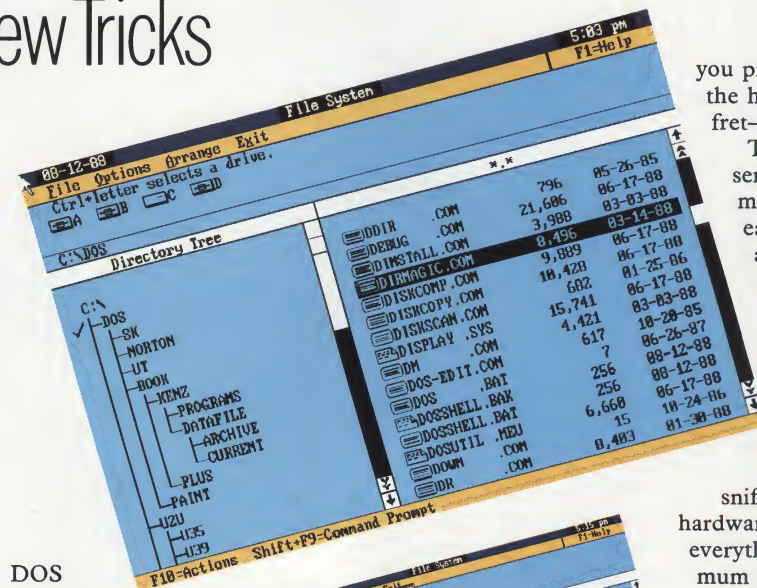
New DOS, New Tricks

Who says you can't teach an old DOS new tricks? For years, the best minds at Microsoft and IBM have forced users to wrestle with awkward tools and absurdly thorny command syntaxes to do even elementary tasks. But with the startling new release of DOS 4.0, IBM has tamed the beast.

This new version finally recognizes that most users have hard disks and lots of memory. Its revised Tree command draws a graphical subdirectory map instead of trying to describe complex hard disk structures with words alone. The brand new Mem command instantly reports on the total amount of RAM in the system, including any extended or expanded memory (it supports LIM EMS 4.0). And DOS 4.0 makes it far easier to use hard disks larger than 32MB.

Many commands are friendlier than they've been. DOS now keeps you posted on the progress of disk formatting by telling you what percentage is done instead of reeling off head and cylinder numbers. When you enter a long command DOS doesn't understand, it tries to tell you which part it can't figure out. DOS can now use a 12-hour clock, automates selective file deletion, speeds up AT and PS/2 keyboards, and can increase the number of rows onscreen.

There's also far less to hate in the familiar beige



DOS manual.

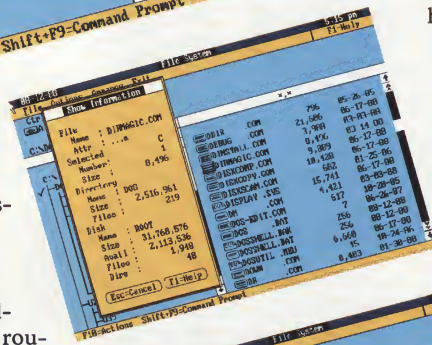
It's slimmer, intelligently redesigned, and brimming with useful examples. Advanced users should get their hands on the separate Command Reference manual, a 300-page volume that lists all DOS routines alphabetically, provides a wealth of information about every important DOS topic, contains helpful lookup tables, and introduces an ingenious new kind of command diagram. It's available at extra cost.

The best news to most users, however, is IBM's sizzling new interface, called simply the DOS Shell. Based on IBM's SAA standard (which will also be implemented in the forthcoming OS/2 Presentation Manager), this simple, extremely powerful, mostly intuitive disk and file man-

ager makes it a snap to toss off your daily chores without having to enter yard-long strings bristling with backslashes. But if

you prefer doing things the hard way, don't fret—you still can. The DOS Shell also serves as a foolproof menu system that's easy to customize and even easier to use. It sports context-sensitive help and steps you deftly through any tricky spots.

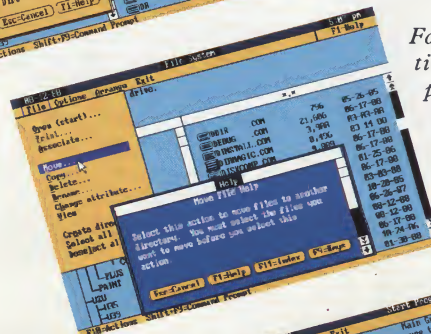
A savvy installation program called Select sniffs out what kind of hardware you have and sets everything up with a minimum of anguish. The price of all this power is \$150, but users of previous DOS editions can buy one for \$95 by trading up. DOS is clearly alive and very well.—Paul Somerson



DOS Shell takes the pain out of DOS.

ager makes it a snap to toss off your daily chores without having to enter yard-long strings bristling with backslashes. But if

For more information on DOS 4.0, particularly its new DOS Shell utility, see "DOS Front Ends" in this issue.





Computer Learning Month

October is Computer Learning Month, and all across the United States and Canada, schoolchildren, teachers, families, businesses, and individuals will be participating in events designed to promote understanding of the technology.

"We're trying to motivate those who know how to use a computer to teach those who don't," says Sally Bowman, director of Computer Learning Month. "Our focus isn't on computers as an end, but as a means to an end."

Bowman's organization offers three free booklets: *Everything You Need to*



Kids across the country will take part in Computer Learning Month activities.

Know (But Were Afraid to Ask Your Kids) About Computer Learning, which tells parents how computers are used for learning and how to choose the right equipment; *Preparing for a Career in the 21st Century*, which

describes the use of computers in a variety of jobs; and the *Family Activities Guide*, which outlines computer activities that kids and parents can do together.

If you're interested in joining the fun, contact your local school, computer dealer, or user group. Infor-

mation about Computer Learning Month, planning kits (\$12.50 for shipping and handling), lesson plans, and more are available from Computer Learning Month, P.O. Box 60007, Palo Alto, Calif. 94306.

—Jane Hallisey

DRAM Drought Easing

Many people recall with a mild shudder the long lines, high prices, and scarcity that afflicted the United States during the oil shortage of the 1970s.

Which is probably the way many computer industry executives will remember the past year. This has been the year of the dy-

namic-RAM chip shortage, which forced companies out of business as it pitted Silicon Valley's contentious neighbors against one another in the effort to acquire an adequate supply of this most essential component of high-tech gadgetry.

Fortunately, according to many DRAM market watchers (which at this point includes virtually anybody who makes, buys, sells, rents, or steals computers), the chip shortage that held high-tech America hostage will be only a bad memory by the first or second quarter of 1989.

Gerald S. Fleming, a

computer industry analyst for Bear, Stearns and Company in New York City, says the chip shortage is "clearly easing." Production capacity is increasing, he says, and spot prices are decreasing—both indicators that the gap between supply and demand is narrowing.

But others are not as optimistic.

Take networking products developer 3Com Corporation, for example, which is expecting only partial relief.

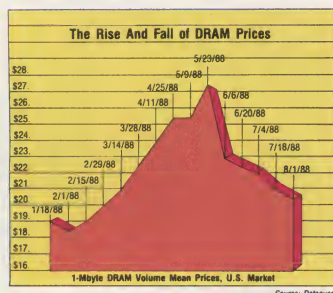
More of the newer 1MB DRAM chips will become available shortly, because the manufacturing capacity for these chips is increasing each quarter, according to

Gary Heidenreich, production operations director for 3Com's distributed systems division in Santa Clara, California. But the 256K chips, which are to the computer industry what two-by-fours are to the construction industry, will still be hard to get.

"I'm really concerned about the 256K chips," Heidenreich says. "They will continue to be more difficult to find."

How fast that shortage subsides depends largely on how fast computer manufacturers can retool their products to use the 1MB chips rather than the older 256K chips.

—Avery Jenkins



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Computer Angst

When Jan L. Guynes, a researcher at the University of Texas at Arlington, began to look at how different people react to a slow computer, she figured the greatest frustration would show up in Type A per-



sonalities—"You can tell them by the way they bang on their keyboards," she says.

She was wrong. *Everyone's* anxiety jumped to statistically high levels when confronted by slow or inconsistent system response times. "Even some of the more laid-back Type B personalities became quite hostile," she recalls. "I heard quite a few of them swearing mystical oaths."

In her research Guynes classified 86 volunteers as either Type A (competitive, driven, impatient) or Type B (calmer, more patient), then gave them 20 minutes to edit a short text on a terminal. While they worked, she manipulated the computer's response time at

random, so that the volunteers faced unpredictable delays of up to ten seconds at a time. Although the Type A personalities began the experiment with the highest anxiety, by the end both groups had reached the same level of agitation.

For employees who spend most of their workday at a PC or terminal with a sluggish response, these results don't come as a surprise. After looking at other studies on the effects of anxiety, Guynes concluded that over time such employees could experience not only emotional tension, apprehension, and erratic short-term memory but also physical effects such as increased heart rate, elevated blood pressure, and muscle tension. The net result: a decline in productivity.

Although the experiment was conducted on terminals, Guynes emphasizes that its outcome is just as valid for workers using personal computers. "This should affect the way software is written," she suggests. "Some of the database software in particular is still too slow."

—Norman Boucher

AlphaWorks: The Exception to the Rule

Good, fast, or cheap—pick two," goes the saying. With computer software, the trade-offs are ease of use, power, and cost. Usually you get two, sometimes only one. The most feature-rich software can be expensive *and* difficult to use. But there is an exception to the rule.

AlphaWorks, from Alpha Software of Burlington, Massachusetts, offers a word processor, spreadsheet, database manager, and communications program—all powerful and easy to use—for \$195.

AlphaWorks' word processor has the usual functions plus extras like standard layout definitions, an envelope-printing feature, and a dictionary and thesaurus. The program handles ASCII text files, opening the door to accept documents from almost any word processor. A chaining feature that links multiple files at print time makes the document size limitation—64K, or about 32 pages—more tolerable.

The spreadsheet component looks and works like Lotus 1-2-3 Release 2.0 and uses the same file structure and similar graphing facilities. It improves on 1-2-3, however, in its ability to print graphs without leaving the spreadsheet.

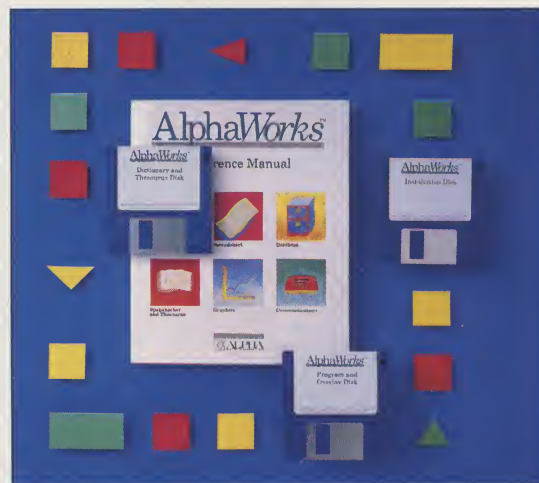
AlphaWorks' database manager uses dBase III Plus file formats and most dBase functions, but a Field Rules feature validates en-

tries or otherwise manipulates data in ways that would require programming in dBase. AlphaWorks lacks a programming language, although a keystroke-capturing macro facility can be used with all the applications.

The communications program has all you'd expect, including the ability to create time-saving log-on scripts, and it's capped with a bit of the unusual: you can connect with two computers at the same time.

While you may need the documentation to get a handle on some of the fancy features, if you're at all familiar with the PC you probably won't even have to crack the manual.

You can spend more for individual programs or for high-end integrated pro-



AlphaWorks: good, fast, cheap.

grams, but if you need a functional multipurpose program for work or home, check out AlphaWorks. It's got a lot, it's simple to use, and it doesn't cost much. Pick three. —Bruce Brown

PHOTOGRAPH BY STEVEN GREENBERG; ILLUSTRATION BY JULIA TALCOTT

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FIVESTAR 286's. **The performance to fly through heavy workloads.**

FIVESTAR 286's provide the features and performance aggressive companies need to reach higher corporate goals. In fact, they're designed to run future as well as current operating systems.

The 286/10 is powered by an Intel 80286 microprocessor that operates at a fast 10 MHz, with zero wait states. With 640KB memory and 1.2MB floppy disk drive, you'll soar through today's popular business applications. Serial, parallel and game ports, and an enhanced 101-key keyboard, provide in-flight convenience.

The 286/14 is also powered by an Intel 80286 CPU, but operates at 14 MHz (with zero wait states) for even faster performance. It, too, comes equipped with 1024KB memory, 1.2MB floppy disk drive, serial/parallel/game ports and a 101-key keyboard. No doubt about it — it's a hot machine and a dream to fly!

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All Things to Some People

Wouldn't it be nice if you could boot up one software package in the morning and accomplish an entire day's work without switching programs?

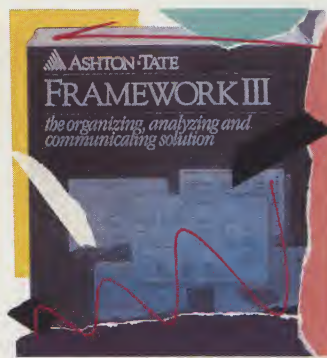
Ashton-Tate, of Torrance, California, is trying to do just that. The company has released Framework III, a \$695 integrated software product that promises to be all things to some people.

Combining word processing, spreadsheet, database management, business graphics, outlining, and telecommunications capabilities, this successor to Framework II includes much-needed improvements in most of the major functions. And Framework III uses dynamic integration, meaning that information changed in one of the modules is updated automatical-

ly in other modules.

The word processor now has a new spelling checker and adds an integrated thesaurus, as well as multiple snaking columns and expanded printer support. If you do business around the world, or just want to correspond with a pen pal in Norway, you can purchase a disk with a spelling checker, thesaurus, and hyphenation program for one of several languages, including the Queen's English.

In addition to overall enhancements in the spreadsheet, graphics, outlining, and database modules, Framework III has new features that improve ease of use and user productivity. Mouse support is avail-



able to help speed through the myriad of pull-down menus, and screen colors can be customized for each of the desktop display frames, to accommodate assignments like showing negative numbers in red.

A major new feature is the optional (\$100) electronic mail module, which uses the MHS (Message Handling Service), an industry-standard message format developed by Action Technologies and Novell. This feature permits you to exchange executable Framework III files with other Framework users, and

it offers unattended mail delivery and receipt, distribution lists, and other nifty features. The electronic mail functions will be included as standard in the five-user network version of Framework III (\$995), scheduled to ship at the end of October.

Although Framework III can run on a dual-drive system, you'll be a lot happier using it with more than the 640K RAM requirement (LIM EMS 4.0 support is included) and a fast hard disk.

—Jon Pepper

W And the Answer Is

ho sold Katharine Hepburn a computer in the movie *Desk Set*?

That's just one of the questions that stump even the most devoted computerphile. On Fri-

day, October 7, some of the industry's most popular devotees will square off in Boston to ponder similar queries—and certain meatier mysteries—in the first Computer Bowl.

It's East meets West as teams headed by Richard Shaffer, publisher and editor of the *Technologic Computer Letter*, and David Bunnell, chairman and CEO of PCW Communications, test their

knowledge of computer history, technology, and trivia.

The Computer Bowl is a fund-raising project of the Computer Museum in Boston. The \$500 tickets include a high-tech tailgate party, a seat at the games, and dinner after the competition. The Bowl will be broadcast via satellite to the West Coast. For tickets, contact Pat Nelson of the Computer Museum at (617) 426-2800, extension 346. —Jane Hallisey

Katharine Hepburn in *Desk Set*.



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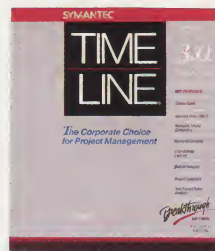
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Project Management with Training Wheels

The Software Publishing Corporation is reaching out to managers who have to juggle people, resources, and tasks but lack formal training or experience in project management.

In its most recent release, Harvard Project Manager

3.0 brings these managers into the fold, not by crippling the package or condescending to novices, but by adding a bridge that lets users take their first tentative steps into project management, build confidence, and, if they choose, become HPM power users.

The bridge: Fast Track, a clean, simple interface that guides the novice through project scheduling. Move the cursor to a task start date and begin typing. A box pops open and asks for the task name and the length of the project. Hit Enter when you're through, and the task appears on the screen. Toggle to the PERT, Gantt, or work breakdown view, and the program automatically translates project data to

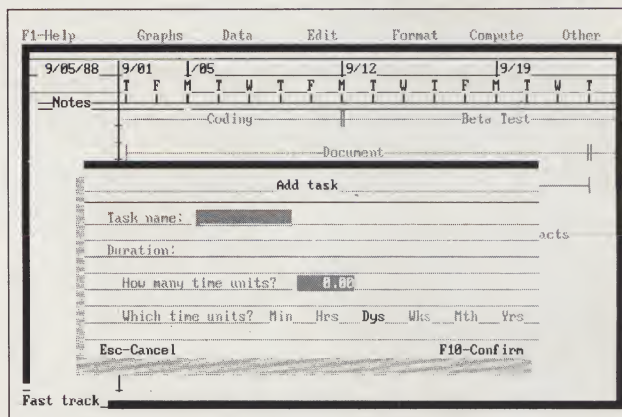
the proper format.

Once you become comfortable with the package, you can take the electronic training wheels off. Use the "speed keys" as a shortcut around HPM's drop-down menu. Enter data directly into a PERT chart, stepping past the Fast Track interface.

Harvard Project Manager 3.0 won't turn you into a certified project manager overnight, but for \$695 it will take the intimidation out of getting started.

—Chris Shipley

Fast Track makes it easy to get going with Harvard Project Manager.



Ventura Branches Out

Ventura Publisher, the top-of-the-line PC-based desktop publishing package from Xerox, has extended its reach even further.

The latest release, Version 2.0, is really a



Ventura Publisher reaches up, out.



family of products. It improves upon earlier versions at the low end with ease-of-use enhancements, and at the high end with its Professional Extension and Network Server additions.

The core of Ventura Publisher includes some 70

new features and sports improved context-sensitive help menus, a choice of pull-down or drop-down menus, and keyboard shortcuts. It lets you define color values and print color separations, supports a number of graphics formats (including TIFF files), and offers gray-scale image control for PostScript and non-PostScript printers. The base price of the new release is \$895.

Professional Extension is clearly intended for the serious desktop publisher, given its sophisticated fea-

tures and hardware overhead. If you expect any sort of performance at all, you're going to need 2MB of expanded memory. But once you make that investment, Professional Extension will support huge documents.

For its \$595 price, you also get vertical justification, cross-referencing capabilities, a Wysiwyg equation writer, and a rich table-generation facility.

The Network Server runs on most popular networks, including 3Com, Novell, and PC-Net, and enables you to designate shared documents as read-only files. The \$1,295 price tag includes the network software and one copy of Version 2.0.

—Chris Shipley



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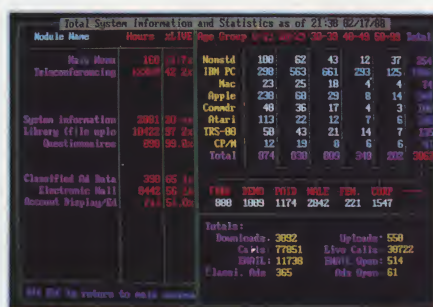
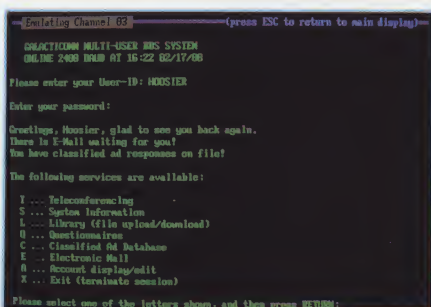
Our multi-user Bulletin Board System software, called **The Major BBS™**, supports your customers in several ways:

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- Teleconferencing online "seminars" and real-time interaction
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- Questionnaires for market research, order forms, etc.



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The Major BBS can support **up to 64 users** simultaneously, although most of our customers operate small 4- to 16-user systems. The C source code is also available, so that you can modify the system to suit your specific requirements.



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Battery Hotline

Did you know that your PC has a battery that will eventually need to be replaced?

Most people don't—until their batteries fail.

Clairvoyant Systems, a distributor of PC batteries, has started a hotline to answer questions about PC batteries. A caller can order batteries, or, with new battery in hand, be guided through the simple battery replacement process.

The number is (800) 336-5933; in Illinois, call (312) 336-5933.

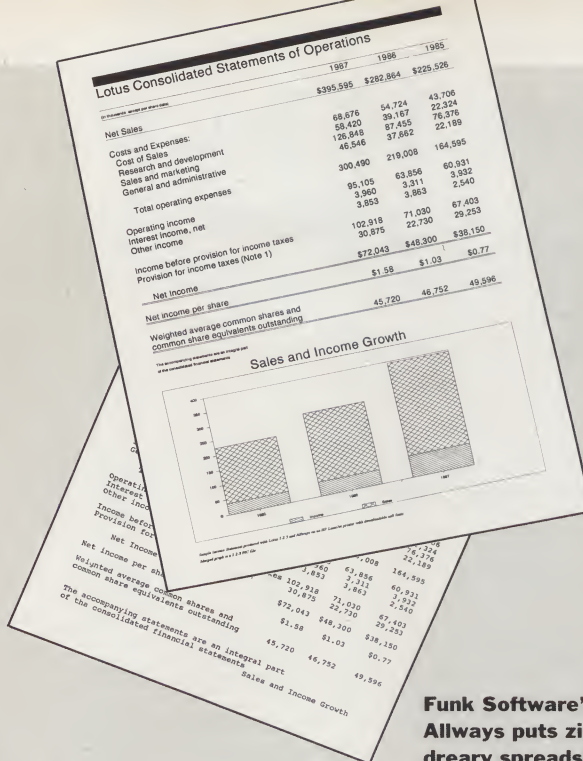
Print a Funk-y Spreadsheet

By some estimates, over 90 percent of the more than 4 million Lotus 1-2-3 users print their spreadsheets. That's mountains of gray, dull, sometimes indecipherable numbers.

Funk Software, the Cambridge, Massachusetts-based developer of 1-2-3 enhancement products, is breathing life into those bleak printouts with Allways, a "spreadsheet publisher" that reached dealers' shelves last month.

An add-in for Lotus 1-2-3 Releases 2.0 and 2.01, Allways lets you highlight rows, columns, and cells in three shades of gray; double-underline rows; easily adjust the width of columns and heights of rows; and add headlines in eight fonts and variable point sizes.

Dumping graphics onto the page is a snap. Simply select Graph Add from the



Funk Software's Allways puts zip into dreary spreadsheets.

Allways menu, choose the graph from the list of .pic files, and define a range for the size and placement of the graph.

The best thing about Allways is that it's truly simple. A quick breeze through the manual, and even the

most klutzy and time-pressed 1-2-3 users will be printing smart-looking spreadsheets.

For the millions who need to print spreadsheets that stand out in the boardroom but don't want to switch to *Excel* to get them, Funk's \$149.95 Allways is the answer. —Chris Shipley

They Don't Mean Any Harm

The threat of viruses strikes fear and loathing into the hearts of computer users. But most PC-propagated viral infections are the brainchildren of pranksters, not criminals, according to the director of the National Center for Computer Crime Data.

"There doesn't appear to be a profit motive or destructive intent in most of the virus cases I've seen," notes Buck BloomBecker, a Harvard Law School graduate and former Los Angeles County deputy dis-

trict attorney who founded the L.A.-based center in 1980.

"Most creators of viruses apparently do it just to prove they can and that they're more clever than the designers or defenders of the target software," BloomBecker says. "It's not clear how big a problem the virus phenomenon is. Perhaps it's just a novelty, and the virus creators will do something else when the newness wears off."

His conclusion, BloomBecker emphasizes, is tentative. A final report on computer crime data, with an emphasis on viruses, will not be ready until the first quarter of 1989.

Much like biological viruses, a computer virus is a "self-replicating Trojan horse," explains BloomBecker. It is typically transferred from a bulletin board, network, or other shared program and "lies in wait until the triggering message tells it

to go forth and multiply."

Even though BloomBecker has not collected many viral horror stories, he believes the potential for great harm to unvaccinated software is large. He suggests users avoid bulletin boards and public domain and other shared programs. Users should also watch for changes in the size or pattern of a program.

—William K. Stuckey

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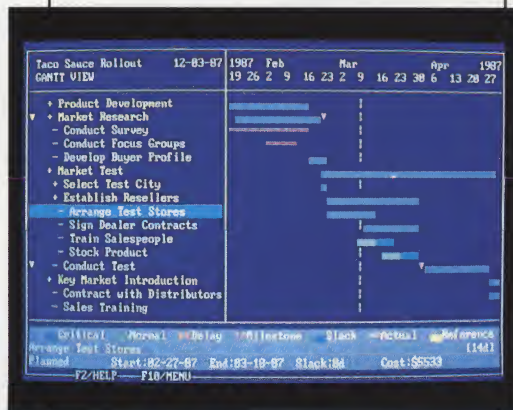
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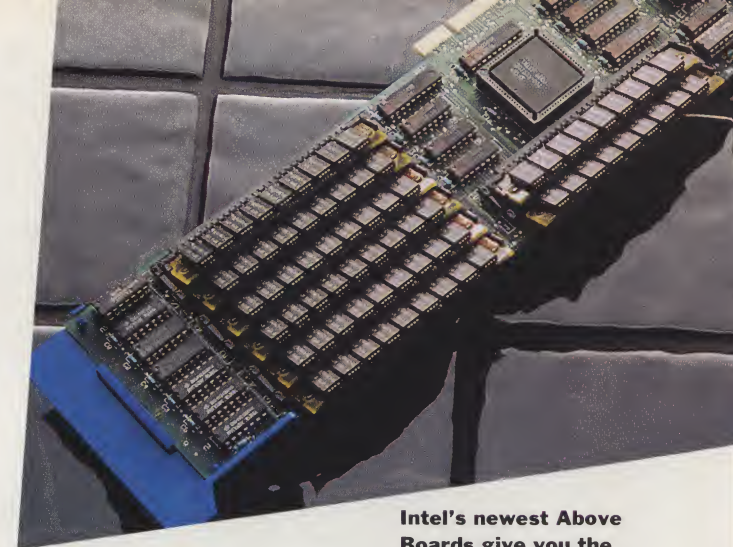
Thanks for the Memory

You say you're a multitasking DOS man who's a little sore from hitting those memory barriers when you try to run Windows, 1-2-3, and Side-Kick? Intel's new crop of Above Boards should ease the pain.

Above Board Plus and Above Board Plus I/O give you the headroom you need—up to 8MB—for multitasking above 640K on IBM PCs, XTs, ATs, PS/2 Model 30s, Compaq 386s, and compatibles. The

boards support Version 4.0 of the Lotus/Intel/Micro-soft Expanded Memory Specification (LIM EMS 4.0) and OS/2 operation. Each holds 2MB of memory; add a piggyback card with room for 6 megs to get the full 8MB.

The only difference between the two boards is that the I/O comes with serial and parallel ports. The 512K versions cost \$795 for Above Board Plus, \$945 for Above Board Plus I/O. A piggyback card with 2MB is \$2,195; call Intel at (503) 629-7354 to get prices for



Intel's newest Above Boards give you the headroom you need.

the fully loaded board.

Users of the PS/2 Models 50, 50Z, and 60 needn't fret. Intel's got an Above Board for you, too. The Above Board 2 Plus offers up to 8MB of expanded or OS/2 memory in a single slot. The 512K version is \$795; call Intel to find out price and availability for a 2MB board.

Intel is also offering an upgrade for Above Board 286 users who run Windows 2.0 or Desqview 2.01 and want the multitasking capabilities of EMS 4.0. The deal is good through the end of the year and will set you back only \$100.

—Kenan Woods

Unhidden Agenda

No sooner had Lotus Development announced the delivery of Agenda than the aftermarket for the personal information manager was born.

But unlike most coattail riders who profit from a leading product's success, Agenda enhancement developers are working at the provocation of Lotus, which is banking on *them* to help spread the word.

As early as last fall, Lotus began evangelizing the technology that Agenda represents: the personal information manager, a free-form database that lets users enter information as they receive it, "on the fly." But because Agenda represents

a new breed of software, Lotus reasoned, users have to be shown its possibilities.

That's why Andrew Hammond, market development manager for Agenda, believes third-party applications are very important to the program's success. "It's the expertise and imagination of the third-party developers that make Agenda sparkle," he says.

The Cambridge, Massachusetts-based company approached third-party vendors early in Agenda's development cycle, so that applications would be ready when the product shipped.



"We've never developed a training product without an established base of users before," says Mary Alice Lilieholm, marketing manager for Anderson Soft-Teach, which offers video-based training for Agenda. Recognizing the importance of third-party training support, Lotus contacted Anderson Soft-Teach while Agenda was still in development.

Currently, about 200 developers are working on or are shipping products. Applications include a database of the 100 hottest restaurants in New York, San Francisco, and Boston,

an application that lets contractors, foremen, and architects control the details of a construction project, and templates that help lawyers keep track of cases.

With the avalanche of interest among third-party developers, Hammond says, the aftermarket for Agenda could become a cottage industry analogous to the one that grew up in the wake of Lotus 1-2-3.

—Kenan Woods

ILLUSTRATION BY JULIA TALCOTT

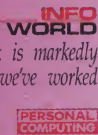
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COPROCESSOR SUPPORT	80287/387	80387	80287	80287
32-BITSLOTS	—	1	—	—
16-BITSLOTS	6	4	6	6
8 BITSLOTS	2	1	2	2
SERIAL PORTS	2	2	2	2
PARALLEL PORT	1	1	1	1
HARD DISK/HD. CTRL.	YES	YES	YES	YES
1.2MB 5 1/4" OR 1.44MB 3.5" FD.	YES	YES	YES	YES
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For the Pack Rat in Us All

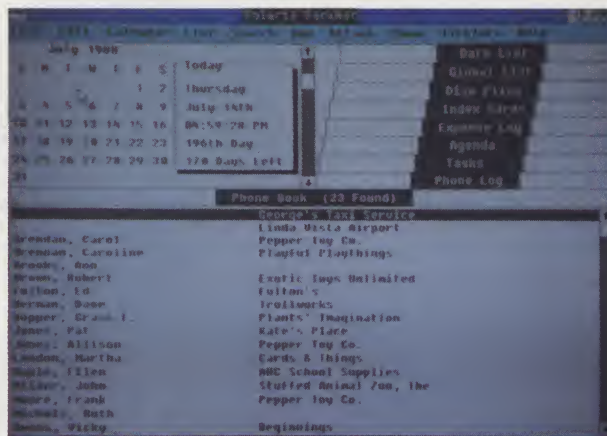
We all tend to carry around extra baggage—some of it not so easy to organize. Now, PackRat, created by Polaris Software of Escondido, California, helps those of us saddled with information to keep it orderly and accessible.

PackRat, at \$395, is a Windows application, and that's its plus. With multiple applications running concurrently, Windows users need an organizer. PackRat is full of typical features—phone book, calendar, appointment agendas, to-do lists, and an index card-type database—as well as extras like the ability to attach files to phone entries and lists.

PackRat searches individual lists by key word and date or multiple lists by date, making it easy to find a list of clients employed in San Francisco, or appointments scheduled the week of July 25. Nearly all of the functions and features are integrated, so that you can relate a to-do item with a phone book entry or connect a group of people with a scheduled meeting.

You can also make a task dependent on or prerequisite to other tasks, making PackRat a bit of a project manager.

As with all Windows ap-



PackRat organizes the closets of your mind.

plications, it helps to use a mouse. PackRat employs a quick search for mouse users—allowing you to bring up a day's schedule, for example, by simply pointing at the day on the onscreen calendar and clicking.

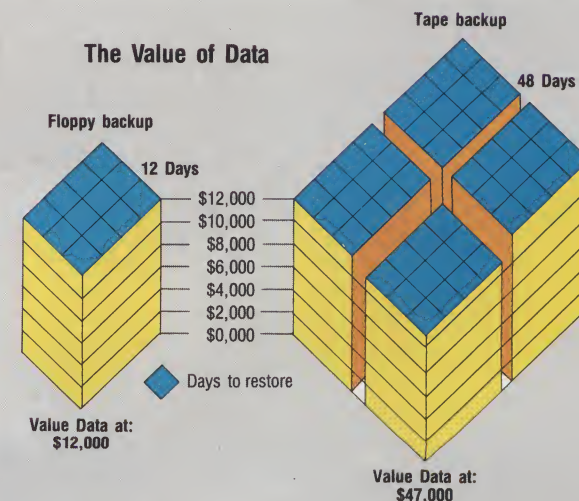
If you are operating in the Windows environment, then PackRat may be the means to unravel the skeins of information in the enormous attic of your personal database. —Mike Burgard

Message in the Media

If you back up your hard disk on floppies, you probably don't care a lot about your data.

That's the raw conclusion of a study conducted by International Data Corporation for 3M.

IDC, located in Framingham, Massachusetts, surveyed 200 PC users and found that those with tape backup systems value their data almost four times as much as those who



use floppies. In fact, tape users say it would cost about \$47,000 and take about 48 days to restore lost data, while floppy

users cite restoration costs at an average of \$12,000 and 12 days. —Susan Jelcich

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If It's Out There...

The PC Yellow Pages won't replace its bulky paper counterpart (you'll still need to give the kids a boost at the dinner table), but it can be a boon to businesses.

Developed by Digital Publications of Norcross, Georgia, PC Yellow Pages is more than an electronic phone book. Sure, it lists 10,000 toll-free numbers nationwide, including those of the Fortune 1000 and 5,000 businesses in your area. But it also dials the numbers, merges addresses with letters, and prints Rolodex cards and address labels.

More than 50 PC Yellow Pages Information Pak additions, which range in price from \$29 to \$279, address specific vertical markets—from TV stations to food producers. Use these to identify potential clients, buyers, advertisers, sources, and benefactors.

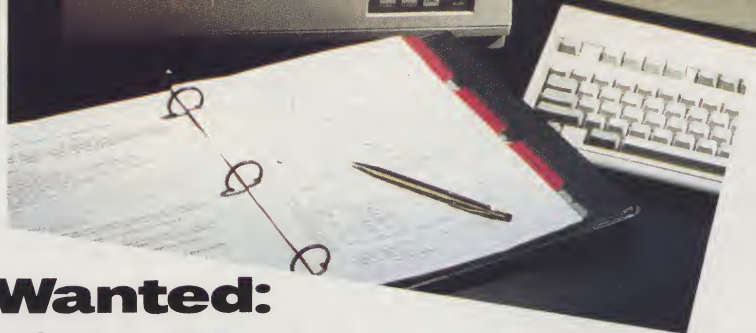
Then use the Power Call feature to descend on them like a well-staffed telemarketing bureau. Power Call automatically dials entire sections or tagged entries sequentially and redials them if necessary.

PC Yellow Pages costs \$99.99 plus shipping and handling, and the Information Paks are updated twice in the first year for a \$7 handling charge.

—Chris Shipley



Who-What-When makes you look good on paper.



Help Wanted: Part-time Manager

You'll probably get but one chance to set up your PC in the corporate boardroom and demonstrate your project management skills. If the gray-suiters grow bored from the constant key-clicking of a confusing presentation, they may just leave the room... and leave you with some time alone to polish your resume.

A new project management software package can help ensure this never happens to you.

What separates Chronos Software's Who-What-When from all the other

project management systems on the market isn't so much the software itself, but rather the portfolio it's bundled in. PCs can be great attention-grabbers in the right setting, but a well-organized compendium of printouts will be infinitely more useful when you're in the company of bigwigs. And Who-What-When delivers the goods.

Although the heavily padded three-ring binder comes covered with chintzy-looking vinyl, it is

without peer for project management. As you might expect, it has three major sections for the Who, What, and When of any project, with additional dividers for names, tasks, and dates.

When one of the standard formats isn't quite what you're after, there's an "Etc." report generator for dashing off memos (up to 64K of which can be attached to any item), mailing labels, and the like.

When you want to make a few quick entries and your PC isn't at hand, Chronos, based in San Francisco, has included several paper forms for jotting down information for later entry.

Toss in a built-in calculator, autodialer, pop-up calendar, alarm clock, Gantt time charts, and more, and Who-What-When becomes a perfect tool for the busy executive. Its lack of flexibility when compared with general-purpose information managers (such as Lotus's Agenda) is made up for by its ease of use and lower price (\$189.95).

Still, I can't help but wonder—what happened to Where, Why, and How? Perhaps they'll show up in the next release.

—Frank Bican

A Message from Our Sponsor

Tired of reading soup can labels while you wait in the grocery store checkout line? Here comes VideoCart.

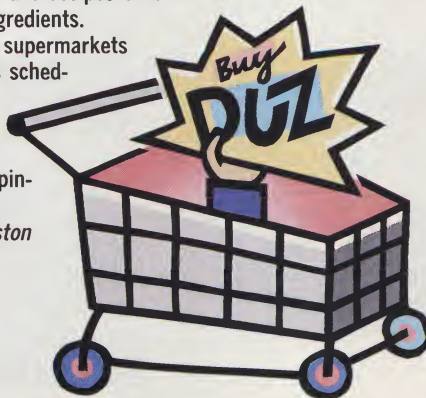
The marketing mavens at Information Resources, Inc., have mounted 6-by-8-inch liquid crystal displays on the handles of shopping carts so as to addle shoppers with even more advertising, not to mention interactive trivia and video games.

Grocery ads are transmitted to stores across the nation by IRI's wideband satellite, downloaded at the market, then transmitted from a PC to VideoCarts using a low-powered FM transmitter. There's nothing subliminal about the strategy. As an unsuspecting shopper rolls the cart down the coffee aisle, for example, a coffee ad appears on the VideoCart screen. Plugs for related products can be beamed over as well: buy a steak, get an ad for steak sauce.

Only 15 percent of VideoCart's program material will be advertising, the folks at IRI promise. Shoppers will also get a video magazine, store maps, local news, and recipes that include aisle locations for all the ingredients.

IRI will test VideoCart in three supermarkets in September; a national rollout is scheduled for 1989. The company plans to have 10,000 VideoCarts in place by 1991. By that time, old-style shopping carts may be spinning their wheels.

—Christopher Johnston



ILLUSTRATIONS BY JULIA TALCOTT

Tecmar Backs Up the PS/2™ Inside and Out.



An advanced personal computer like the PS/2 demands advanced data protection. That means Tecmar tape backup.

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Tecmar's external QT tape systems offer maximum ver-

satility. With extra interface adapters, a single external drive can back up multiple computers. And, because we offer interface adapters for ATs and XTs in addition to PS/2s, you can even use one drive to back up *both* Micro Channel™ and classic bus systems! So now you can share the cost and protection.

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*QIC-60 tape drives use QIC software, are covered by a one-year warranty and are not covered by QuickTurn Quality Service.

TECMAR
The Power Behind Your PS/2

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CIRCLE NO. 168 ON READER SERVICE CARD.



Street Sweeper



Glenda Chesser outside her home.

Glenda Chesser was mad as hell, so she did something about it.

Chesser and her husband moved into a nice neighborhood in Indianapolis, only to discover that their street was home to the area's prostitutes. So Ms. Chesser used technology to combat the oldest profession. Noting a law that made prostitution a felony on the third offense, she created a database of local women facing prostitution charges. With an IBM PC, Professional File, and 1-2-3, she put together a program to remind her

when each case was going to court.

Then, armed with printouts of arrest records, she descended upon area courtrooms like an avenging angel, testifying on behalf of prosecutors and against the streetwalkers, one of whom had been convicted 55 times for prostitution-related offenses.

Since the beginning of her computer-spearheaded drive, the conviction rate for prostitution has risen from 70 to 80 percent, and twice as many convicted prostitutes end up serving time.

Her neighborhood, she estimates, has one-twentieth the number of prostitutes it had before the program began. Indeed, the prostitutes have become so scarce, she notes, that when the *New York Times* wanted to photograph them for an article it was preparing, none could be found.

—Preston Gralla

Copy Protection by Any Name

William Shakespeare once wrote, "That which we call a rose by any other name would smell as sweet."

But the developers of the Software Sentinel don't agree with the immortal bard. Rainbow Technologies, of Irvine, California, is hoping that its product might smell a little sweeter labeled as "program execution control" rather than what most people would call it—copy protection.

Rainbow Technologies' director of marketing, Lynda Dahl, argues that the Software Sentinel is markedly different from other copy protection.

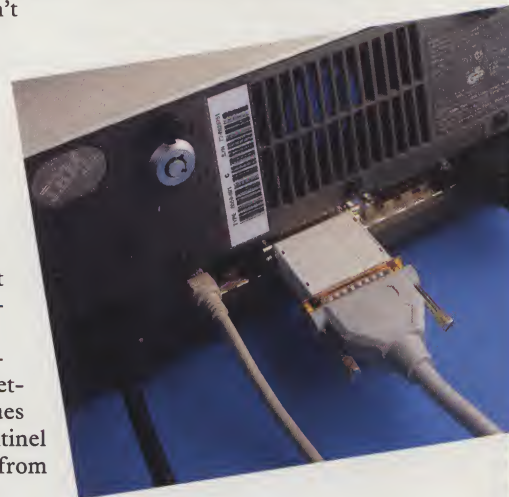
The Sentinel is a small device that plugs into the parallel port on the back of a PC. Software developers can modify their applications to check for the existence of a Sentinel. If it's not there, the program

won't boot. Each Sentinel is linked directly to each copy of a product, so a single Sentinel will not validate different serial numbers of the same application.

What makes the Sentinel's approach different from other copy protection schemes, Dahl says, is that it allows any number of backup copies to be made and does not require

the use of much-disliked key disks. Once installed, the Sentinel is transparent to the user.

Historically, users have disdained copy protection. In 1985, the industry group



ADAPSO saw that the myriad methods of copy protection "were getting out of control," according to ADAPSO spokesperson Chris Carleton, and began a push to develop an industry-wide standard for copy protection. ADAPSO sent out 4,000 questionnaires to study people's attitudes toward the subject. Of the 150 respondents, one-third were opposed to copy protection. ADAPSO dropped the project.

Rainbow Technologies is not the only company that thinks program execution control will be the acceptable alternative to copy protection devices. Microsoft recently inked a deal with Rainbow to supply Sentinels for the international versions of its best-selling products.

—Avery Jenkins

Now This Is Glasnost!

And you thought they were discussing nuclear disarmament...

President Reagan and General Secretary Gorbachev are actually duking it out over Tetris, a computer game developed by two Soviet programmers.

At least that's what Spectrum Holobyte, the Alameda, California, company that publishes Tetris, would have you believe. The company has employed look-alikes Jay Koch and Ron Knapp

to promote the \$34.95 game in an ad campaign scheduled to appear in computer magazines this fall.



The Monster Arcade Hit Comes Home!



**Go ahead
Go on a RAMPAGE!**

Now available for Tandy 1000,
IBM PC and 100% Compatibles,*
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800-227-6900, to order direct.

*includes both 5 1/4 and 3 1/2 inch disks

ACTIVISION

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CIRCLE NO. 272 ON READER SERVICE CARD.



Bricklin, Norton Go Vogue

Dan Bricklin a fashion model? It may seem like a ridiculous idea, but there he is: the disheveled software genius who developed VisiCalc, splashed across the pages of *Time* and *Sports Illustrated* this fall in his dungarees and flannel shirt, waxing lyrical about his Dexter shoes. "I could wear them all day at a trade show without wanting to tear off my feet," runs the ad copy.

And Dewar's Scotch has signed up Norton Utilities creator Peter Norton, who calls himself "just your classic nerd who got lucky."

Until now, their fame may not have extended beyond the computer industry, but these two titans of software perfectly fit the Dexter and Dewar's ad campaigns.

Dexter's campaign profiles successful people who will vouch for the comfort of their dress shoes. After dreaming up the headline "Soft Wear Versus Hard Wear," Dex-



ter began looking for someone in the software industry. "We were looking for innovators, and Dan is a legend in the computer industry," says Woody Kay of the ad firm Pagano, Schenck and Kay.

Dewar's, on the other hand, needed someone who would appeal to the California market, says Julie Falkenstrom of the Leo Burnett ad agency. "We figured, what could be more Californian than computers? And Peter Norton not only excels in his career, but he is also an innovator and has outside interests like art."

The 43-year-old Norton caused a sensation in the computer industry in 1982 by creating UnErase, a software program that retrieves lost files. "As a kid, I loved those things on your coat that were supposed to keep you from losing your mittens," Norton wrote in response to the Dewar's Profile prompt, "Why I do what I do." "Who else would design a program to find information 'lost' in your computer, then build a business on it?"

By an odd quirk of fate, Bricklin recently sold Norton his latest software line, Demo II, and it was during negotiations that each one was surprised to learn the other was about to appear in a national advertising campaign. "What struck both of us," says Norton, "was that now it's not such a dumb idea for someone in the software industry to be in your ad."

—Peter Keegan

PHOTOGRAPH BY JOHN GOODMAN

Help! I Need Somebody

Peter Rinearson loves Microsoft Word, but hates its online help facility. So the author of the *Quick Reference Guide to Microsoft Word for the IBM PC* and other books on the subject decided to write Advanced Quick Help, a help file that replaces the one Microsoft provides.

In clear, concise language, Rinearson's context-sensitive help simplifies and expands on the often opaque explanations and directions in Word's help facility. Microsoft's five-screen discussion of macros, for example, is extended to 14 screens in Advanced Quick Help, carefully step-

ping users through the creation and uses of macros. "It gives you a lot of information about Word in a lot of different ways," Rinearson says.

The program is one of 23 files on Rinearson's new Microsoft Word Companion Disk, a 360K disk packed with some 300 macros (one even lets Word recognize WordStar 3.3

commands), sample style sheets and print-merge documents, and a database of all 535 members of Congress. All for \$19.95.

The Companion Disk can be ordered by calling (800) 345-9111, extension 36.

—Chris Shipley

Limited Time Offer Save a Bundle On Our New Bundle.

A lot of accounting software companies will try to tell you their product does more than just accounting. So even though you can get Peachtree Complete™ II—the most complete accounting software—for a lightweight \$199, we won't tell you that it's more than an accounting package. Just that it's the most accounting power you can get for your software dollar.

Now we've bundled Peachtree Complete II and Peachtree Data Query™ II together, and cut the price \$100. So you're not only getting full-featured accounting, you're also getting custom reporting and analysis. Peachtree's "Double Bonus Bundle" gives you two first-rate software packages for one low price—Peachtree Complete II, The Business Accounting System and Peachtree Data Query II, the Custom Reporting Tool for Peachtree Complete II, both for only \$298. And that's the best deal around.

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- Accounts Receivable
- Accounts Payable
- Invoicing
- Inventory
- Payroll
- Fixed Assets
- Job Cost

And Peachtree Complete II is designed using the latest software innovations, like full-color scrolling reference tables, pop-up windows, and short-cut keyed menus. We've increased numeric capacities as high as \$999,999,999.99 in key areas, added Service Invoicing, included Range Printing, and expanded to allow an unlimited number of companies.

Error handling is quick and easy, with plain English messages and suggestions. Context-sensitive Smart HELP is on-line, all the time. And as always, Peachtree Complete II comes with the most thorough documentation—a separate quick-start Installation Guide, Accounting Primer, seven-volume Reference Library, and extensive on-line tutorials on each module—all at no extra charge.

Save Even More on Peachtree Data Query II. So while you're getting



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And now, PDQ is easier than ever to use, with all new user instructions and on-line practice sessions that lead you through the system and build confidence as you go.

Choose from PDQ's own pre-defined reports, design your own (and

store the formats for future use), even export data to popular applications like dBASE III® and Lotus 1-2-3®. PDQ's simple, clear approach to report writing allows maximum control and flexibility. You can begin creating reports with PDQ in just minutes. And as you continue using it, PDQ can perform highly complex, intricate analyses.

Save a Bundle When You Buy Both. We think using PDQ to make Peachtree Complete II more than an accounting system makes good business sense. So we bundled them

together and made it well worth your while. For a limited time, Peachtree's "Double Bonus Bundle" is available for just \$298. That's two regularly-priced \$199 packages for one low price, and that's a savings of \$100. The "Double Bonus Bundle" is a limited-time offer, so call today!

And of course, if all you need is the best accounting package your money can buy, Peachtree Complete II by itself is still only \$199.

Money Back Guarantee. As with all our products, we stand behind Peachtree Complete II and PDQ II with a toll-free hotline for technical support (\$1 per minute, \$20 minimum on your credit card). And both are covered with a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, you can return the product within 30 days for a prompt refund. That's the Peachtree Software promise. (A \$25 restocking fee applies to all returns.)

Hardware Specifications: Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory (512K required with DOS 3.3) and a minimum 10 MB hard disk. For use with the IBM® PC, PC XT, PC AT, Personal System/2™ and compatibles. 3 1/2" media optionally available. Not copy protected.

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CIRCLE NO. 145 ON READER SERVICE CARD.



The Right Tools?

MS-DOS utilities are a funny breed, fitting somewhere between the operating system and "real" applications. You usually don't need them, but sometimes they're just the right tools.

Revolution Software in Parsippany, New Jersey, is hoping its new utilities, DJ:Disk Jockey and VGA Dimmer, find their way into your toolbox.

DJ:Disk Jockey is a collection of ten programs to

help you manage your hard disk. It does all the things you'd expect—search files for strings, find bad disk spots and make them unavailable, produce sorted directory listings, and encrypt and decrypt files—but two of its tools are standouts.

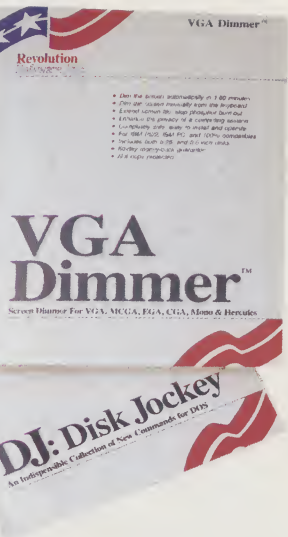
Reorg rearranges your files into contiguous spots on your hard disk. Using it can speed applications, particularly those, like database systems, that read the disk often.

With Findfile you give a filename or pattern (such as

File*.*) and the program locates the file anywhere on your disk.

DJ unfortunately does not have an unerase program, the disk tool that most of us need most often. And although it retails for only \$59.95, many competitors offer products with more features that cost less than \$100.

VGA Dimmer is the software equivalent of an automatic off switch on your



monitor. It blanks your screen if you don't type anything for a given period of time. When you start typing again, the screen image reappears.

VGA Dimmer works with nearly all of the PC video adapter standards: VGA, MCGA, EGA, CGA, Hercules, and monochrome. It doesn't work well, however, with some important applications, such as Microsoft Windows or Hayes's SmartCom, so check the warnings in the manual before you buy it.

Still, you have to ask yourself: Is it worth the \$29.95 retail cost of VGA Dimmer to avoid turning off your monitor?

You might find DJ:Disk Jockey and VGA Dimmer useful, but examine the competition carefully before you buy, so that you get utilities with exactly the features you need.

—Bill Catchings
and Mark L. Van Name

You Think You've Got Problems

Every now and then, computer woes plague even the most ordinary of lives. Take Eustace O. Johnson, an Alabama dairy farmer whose computer reads his cows' necktags and then dumps just the right amount of hay into the feeders. He no sooner got 92 cows programmed into the system—at "four cows to a chip"—than lightning struck the barn and put his program out to pasture.

Many PC problems are almost impossible to foresee. A young Illinois couple, for example, apparently forgot the trauma that moving can cause cats. As they were about to tape up their computer's box, they discovered that their distressed kitty had left them a definitive statement about the move.

Even the most punctilious of us can be hoist with our own petards. Like the Englewood, Colorado, attorney who used

his laptop while handling the eviction of a ranch tenant. He set out on foot to inspect the property, never imagining he would slip on an icy bridge and watch, horrified, as his computer flew out of his backpack and down into the whirling waters of the White River.

But then David Johnston and Sherry Scott have heard stories like these ever since they started Safeware, now the nation's largest source of computer insurance, in 1981. The company insures more than 25,000 clients with combined computer assets valued at over \$1 billion.

While Safeware currently has clients as large as the University of Illinois, the company will insure even small systems used at home. The minimum policy covers up to \$2,000 in computer equipment for a \$39 annual premium.

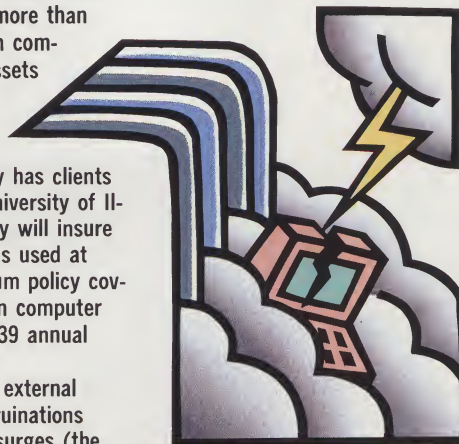
In the event of external damage, like the ruinations caused by power surges (the

biggest culprit) or theft (running second), Safeware reimburses the owner for the replacement cost or replaces the computer.

For traveling computer owners, backpack or no, Safeware also writes an overseas policy.

A simple phone call to Safeware's toll-free line, (800) 848-3469, and your MasterCard or Visa number will buy you some peace of mind.

—Susan Alexander



IMAGINE...

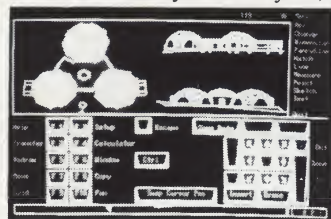
... Now you can create any drawing, design or layout on your computer – within minutes. At last there's a CAD package that's truly easy to use ... that draws superfast ... and delivers the professional results you need.

TurboCAD MAKES DRAWING EASY

Launch yourself into action quickly with TurboCAD's user friendly design. Handy pull-down menus guide you easily through complex functions. Context-sensitive HELP is only a keystroke away. An on-line tutorial and a comprehensive manual help you while you are learning. Draw lines, arcs, polygons, ellipses, fillets, squares and rectangles with ease. Once an object is drawn you can move, mirror, rotate or scale it to your specifications. Use the grid and 18 snap modes to give you the precision you need. Zoom and pan around your drawing to give it that extra detail.

TurboCAD GIVES YOU POWER

Someone with CAD experience will really appreciate the power and speed of TurboCAD. Define an arc in 7 ways. Feel the flexibility of 128 layers, 100 line and arrow types,



256 line thicknesses, 16 colors, different text fonts, cursors and grids. Use rubberbanding, orthogonal and windowing functions to create and edit your drawing with speed. Use linear, array or radial options for

copying. Experience the power of automatic dimensioning and hatching.

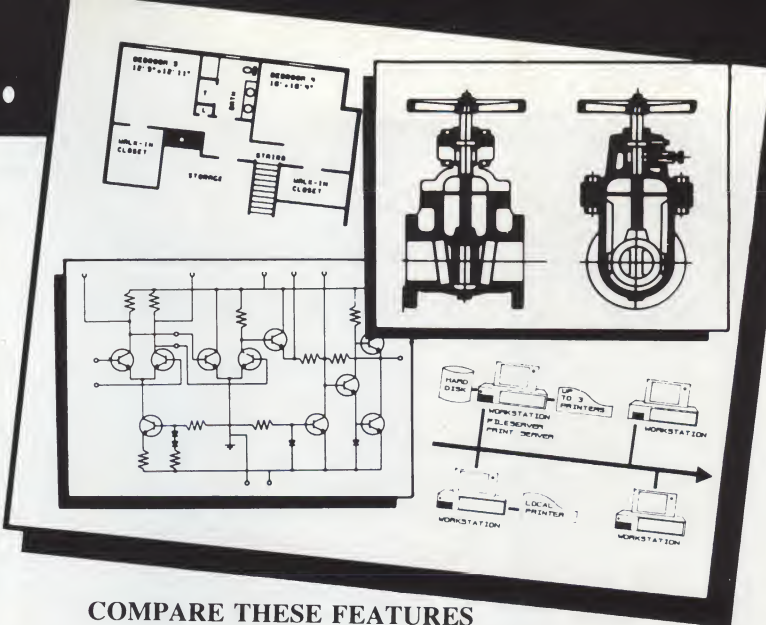
TurboCAD GIVES YOU FLEXIBILITY

TurboCAD works efficiently as an isolated system, or smoothly with other specialized CAD systems. DXF, ASCII and HPGL interfaces ensure compatibility with other micro, mainframe and Desktop Publishing systems. Powerful functions such as a complete Macro language, integrated scientific calculator and easy Symbol library creation open up your creative horizons. Attach attributes to your symbols, and extract a Bill of Materials. TurboCAD will even generate the program code for any drawing in BASICA or TurboPascal.

WHY PAY MORE?

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Context Sensitive HELP	NO	YES
Pull Down Menus	NO	YES
Integrated Calculator	NO	YES
Source Code Generator	NO	YES
Automatic Dimensioning	Add \$50	YES
Advanced Drafting	Add \$50	YES
Dot Matrix Printing	Add \$50	YES
DXF File Exchange	Add \$50	YES
Memory Requirements	512K	256K
PRICE	\$300	\$99

Generic CADD is a trademark of Generic Software, Inc. IBM is a trademark of IBM Corp. TurboCAD is a trademark of Pink Software International LTD.



COMPARE THESE FEATURES

Drawing Features:

- Lines, arcs, rectangles, freehand sketch
- Polygons, fillets, ellipses, tangents
- 100 line and arrow types
- 256 line thicknesses
- 16 colors, 5 text fonts
- 18 snap modes, 128 layers
- 7 ways of defining arcs
- Move, scale, rotate and mirror
- linear, radial and array copy
- Automatic and Associative dimensioning
- Unlimited hatching

Environment Features:

- 3 cursor types
- Variable grid
- Rubberbanding

- Orthogonal mode
- Easy Symbol Library creation
- Windowing
- Attributes and Bill of Materials capability
- Powerful Macro language
- Integrated Scientific Calculator
- Unlimited zoom and pan

System Features:

- Context-Sensitive HELP
- Pull-Down Menus
- On-Line Tutorial
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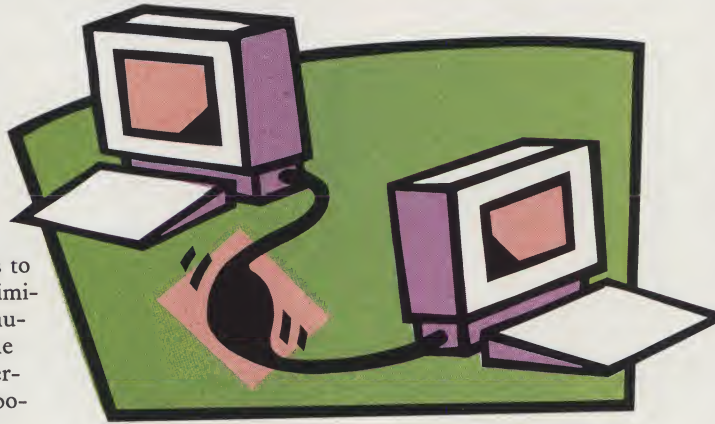
System Requirements: IBM PC/XT/AT/PS2 or compatible
 2 floppy drives or hard drive, graphics card, 256K Ram.

TurboCAD

CIRCLE NO. 284 ON READER SERVICE CARD.



TurboCom: Fast, but Limited



If you need to send files to a remote PC but are intimidated by complex communications programs or the price of long-distance service, take a look at TurboCom 3.0.

TurboCom, developed by the Datan Corporation of La Crescenta, California, is a communications program that automatically compresses files during transmission and restores them to their original state upon receipt, resulting in fewer transmitted bytes and lower phone bills.

Designed for the business user, TurboCom asks little in the way of communications knowledge. In fact, after the initial installation, you'll never have to worry about baud rates and parity again. Just type "Send," the filename, and the phone number. TurboCom takes

care of all the rest.

Unfortunately, this is about all TurboCom does. There's no provision for a host mode, no chatting, and no terminal mode. In fact, TurboCom can communicate only with another TurboCom-equipped PC, which must be set up to receive a call from the program.

In tests, TurboCom did send files three to four times faster than other products that do not compress files. But compact files compressed with other

utilities before transmission moved just as quickly as those sent with TurboCom.

A big concern with this package is security. TurboCom offers no password protection or security check on incoming calls. And although the chances are small that a TurboCom-equipped hacker will log into your unattended system, it's not out of the question.

But if your needs are simple and you keep an eye out for intruders, this \$89 communications program will do the job.

—Doug van Kirk

Get to the Core of the Problem

Tired of the original PS/2 Model 50's limited 20MB hard drive? Annoyed at spending more than \$3,500 for a computer, only to be inconvenienced by a storage shortage?

You're not alone. The complaints of Model 50 owners everywhere have been heard, and Core International thinks it has the answer—an internal hard

disk drive that more than doubles the Model 50's capacity.

The 3½-inch ATplus 44-F can replace the Model 50's original 20MB drive or be used in conjunction with it, making the drive kit "the only option for dual hard disk drives in the Model 50," says Joel Hagberg, a spokesperson for the Boca Raton, Florida, company.

Adding the 44MB AT-

plus drive to your IBM Model 50 gives you more storage space than a Model 60 has—for less than the 60's \$5,295 price.

Not too shabby, considering you can install it yourself with help from Core's concise instruction booklets. All you need is the Model 50, a Phillips head screwdriver, DOS (Version 3.10 or later), and \$1,295.

—Jane Hallisey

Three Wishes and Then Some

This genie has nothing to do with magic lanterns, but it can help you with Microsoft products.

The General Electric Network for Information Exchange, or GENie, now hosts Microsoft RoundTable, an online support forum that provides technical service and information on Microsoft programs. The RoundTable's KnowledgeBase is updated daily and has a bulletin board where users can post questions and receive answers.

GENie offers roundtables on other products, as well as a variety of online services including shopping, news, computer games, financial information, real-time conferences, and electronic mail.

It costs \$29.95 to join, plus \$5 per hour for non-prime-time use of the RoundTable and \$10 per hour for non-prime-time use of the KnowledgeBase. At prime time, each costs \$35 per hour. A GENie user manual costs \$14.95.

For additional information about GENie services and fees, call (800) 638-9636.

—Jane Hallisey



ILLUSTRATION BY JULIA TALCOTT

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high-performance computing
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*Introducing the
COMPAQ DESKPRO 386s.
New technology delivers affordable 80386
performance for anyone considering
80286 PC's.*

Get off to a fast start.

Now, breakthrough technology from Compaq brings the power and potential of 80386-based personal computing to millions of business PC users.

Introducing the COMPAQ DESKPRO 386s. It's the first personal computer powered by the revolutionary new Intel® 386SX* microprocessor. It's also the first designed specifically as an affordable, high-performance alternative to 80286-based PC's.

The COMPAQ DESKPRO 386s will run the software you have today—such as MS-DOS® and Microsoft® Operating System/2 from Compaq—up to 60% faster than most 10-MHz 80286 PC's. It will also run the 32-bit software that 80286 PC's won't run at all. Microsoft Windows/386, for example.

You can tailor the COMPAQ DESKPRO 386s to your exact needs. Choose high-performance storage options such as 20-, 40-, or 110-Megabyte Fixed Disk Drives. Tape backup options. Even diskette drives in 5¼-inch and 3½-inch sizes.

VGA graphics are built in. So is one megabyte of high-speed memory, expandable to 13 megabytes without using a single expansion slot. You can also add a mouse, printers and more without using additional slots.

All these features and more are packed into a sleek new design that fits places the competition can't.

So get into the PC passing lane, and head for all the 80386 power and performance you really want, with the revolutionary new COMPAQ DESKPRO 386s.



*Introducing the
COMPAQ DESKPRO 386/25.
The most powerful
PC available.*

Never look back.

Once again, Compaq introduces a PC that leaves every other in the dust. With its new Intel 25-MHz 386* microprocessor and exclusive 32-bit COMPAQ Flexible Advanced Systems Architecture, the new COMPAQ DESKPRO 386/25 runs up to 60% faster than most 20-MHz 80386 PC's.

FLEX Architecture uses separate memory and peripheral buses operating in concert to maximize system performance, while maintaining compatibility with industry-standard hardware and software. The 25-MHz cache memory controller keeps data instantly accessible, so the processor works at 0 wait states 95% of the time.

With the addition of a 25-MHz Intel 387* or Weitek™ coprocessor, you can match the numeric processing of a dedicated workstation, at a fraction of the cost.

You can go from one standard megabyte of high-speed RAM to 16 megabytes. And, for storage-hungry applications such as most networks and multiuser systems, you can get up to a massive 1.2 gigabytes of storage.† Internal tape backup options are also available.

For CAD/CAE, as a file server and for multiuser systems, the new COMPAQ DESKPRO 386/25 is the ultimate solution. And, for intense PC users who don't have a millisecond to spare, nothing less will do!

COMPAQ

It simply works better.

CIRCLE NO. 181 ON READER SERVICE CARD.

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It's Not Just Luck Anymore

Do you have trouble hitting the numbers? Does that combination of birthdays and anniversaries just never come up?

Some feel it's science, not luck, that rules the jackpot. And according to Sam Valenza, publisher of the monthly *Lottery Players* magazine, the random-number-generating software of yore may not be enough. "Many of the programs coming out these days are pretty sophisticated," says Valenza, a former math professor. "We're seeing some complex analysis, number crunching, and software that looks at historical trends in state lotteries."

None of the programs guarantees you'll hit the jackpot, but many do a fine job of discovering patterns in previous winning combinations, Valenza says. "If there is some anomaly

in the lottery equipment causing the pattern, the software could help you a great deal," he says.

The spate of lottery software is evidence that state lotteries—24 states now have them—have become a big deal. Americans spent some \$13 billion last year on dreams of hitting it big.

"There's a tremendous audience playing, and they want help selecting numbers," says Valenza. "It gets tedious playing birthdays."

Lottery programs usually include a database that tracks past winning combinations and one or more methods for choosing the numbers. Here are Valenza's picks:

Lotto Logic, Macton Industries, Inc., \$79.95, (206) 881-3500.

Econosystems, Intergalactic Publishing Company, \$99.95, (800) 367-9681.

Probaloto 4.3, Olander Company, \$29.95, (614) 475-3315.

Entertainment on Line, Entertainment on Line, Inc., \$29.95, (617) 898-3600.

Soft-Byte, Soft-Byte Computer Programs, \$29.95, (513) 278-1110.

Professional Lottery-Lotto, Prof. Jones, Inc., \$149.95, (800) 553-2256.

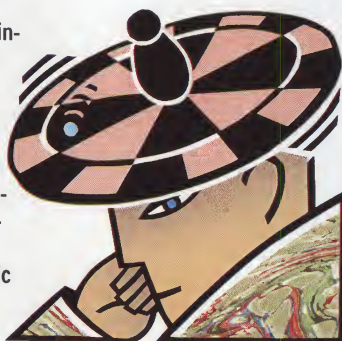


ILLUSTRATION BY JULIA TALCOTT



Computers the United Way

Riddle: What has the same needs and problems that make computing essential to Fortune 500 companies, yet little of the money it takes for computer equipment, training, and consulting?

Answer: The nonprofit agency.

But the Suffolk Community Council of New York has found a way to take some of the puzzle out of computing on a shoestring. Together with the United Way of Long Island, it has formed a computer user group that embraces more than 60 nonprofit agencies in both Suffolk and nearby Nassau County, according to Peter Elkowitz, the council's program director.

And a New York State grant is being used to train employees of the nonprofit groups in the finer points of DOS, WordPerfect, Lotus 1-2-3, Framework, and other software.

Both programs are "unique to Long Island," says Elkowitz. But that may not be true for long. The United Way's national newsmagazine is running a story on the success of the Long Island projects, Elkowitz says, and he is sure that other chapters across the country will take their cue from Long Island and establish their own programs.

—Susan Jelcich

Portability Without Pain

Sometimes, it seems like the p in *portable* stands for pain. Face it: laptop computing can be just plain uncomfortable.

But a couple of odd little accessories promise to make computing on the run a little more comfy.

Input Systems' LapTop Leg is a telescoping monopod that attaches to the bottom of a

laptop with a Velcro fastener. Your knees provide the balance and LapTop Leg bears the burden of the weight.

Jack Weaver, president of Input Systems, says the 6-ounce LapTop Leg came about because he used his laptop frequently in traveling, "and 10 to 14 pounds tends to get pretty heavy on your lap." The alumi-

num leg sells for \$24.95 and can be ordered directly from the Miami-based company by calling (305) 252-1550.

The Laptop Car Seat, manufactured by Zirco, Inc., was invented by president Mark Zirinsky and designer Steve Carney to protect your laptop while keeping it accessible for use in your car.

The 10-inch-high seat, held in place by a seat belt, looks more like a stand or portable desktop. A raised lip and an elastic cord hold the computer in place.

The Laptop Car Seat is available for \$69.95 at computer stores or directly from Zirco; phone (303) 421-2013.

—Jane Hallisey

Buckle up with the Laptop Car Seat.



PHOTO ILLUSTRATION BY JOHN VAN HAMERSVELD



Two in One

Your right brain wants a Macintosh and a mouse. Your left brain wants a PC and Lotus 1-2-3.

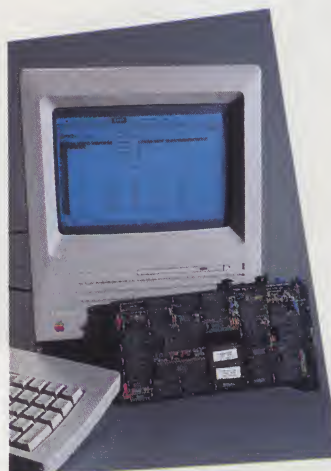
Mac/DOS-SE from PerfectTek of Milpitas, California, can make it easier to live with yourself.

Mac/DOS-SE bridges the gap between your hemispheres by linking Mac and PC technologies. A \$795 coprocessor board, Mac/DOS-SE slides into a Macintosh SE expansion slot and blesses the machine with a DOS-compatible 8086 microprocessor.

The Mac/DOS-SE system lets your Mac run DOS applications and even uses its Mac half to control your DOS displays. That means you get the benefits of Mac graphics in DOS mode, including Multi-Finder and Switcher, and most of the Mac desk accessories.

As a true coprocessor, Mac/DOS-SE can do two things at once—running your arty Mac applications with one brain lobe while the Mac/DOS-SE lobe does DOS's dirty work.

Moving your attention between the two environments is only a matter of keystrokes. Moving disks is somewhat



Mac/DOS-SE puts a PC in your Mac.

more difficult, but PerfectTek provides disk transfer and file conversion utilities as well as a direct transfer cable. Printer and serial ports are built in.

—Winn L. Rosch

Paul Allen: Trail Blazer

What do you do after you've helped create one of the world's most successful PC software companies, made a fortune in the process, started another company, and all the while maintained a personal passion for basketball?

If you're Paul Allen, co-founder of Microsoft Corporation, you buy a professional basketball team. Allen recently realized his dream when he acquired the Portland Trail Blazers.

Allen, who built a basketball court in his Seattle backyard, persisted in his determination to buy the Trail Blazers even when the owner didn't want to sell. Ironically, it was a bid from someone other than Allen that convinced former owner Larry Weinberg to make the sale.

"He's young, energetic. He has a desire to keep the team in Portland, and he's a thoughtful businessman," Weinberg says of Allen. "And he's a basketball fan. That's the most important thing."

On July 5, Allen became the sole owner of the NBA franchise, paying a rumored \$70 million. At that price the Trail Blazers would be the most expensive team in NBA history, according to John Lashway, a spokesman for the team.

"I bought the team," Allen says, "because basketball is one of my real passions and I wanted to be personally involved with a championship-quality team." —Emily Kay



Computer CHiPs

ILLUSTRATION BY JULIA TALCOTT

The California Highway Patrol had a problem: how to turn a cumbersome three-ring binder into a compact book that its motorcycle officers could manage easily.

The solution: MyBase, a straightforward database program that manages output as well as it manages data. MyBase can generate a report in the format of a book, binder, Rolodex card, calendar, or in a style of your choosing.

According to Steven Leon, a spokesman for MyBase developer Useful Software of Woodland Hills, California, the Highway Patrol was able to print hospital and towing company listings, marker locations, and other information in the ticket-sized book.

MyBase makes no restrictions on space—if it fits on your disk, you can publish it. You can cross-reference entries for easy lookup and rearrange data to have a different focus each time you print.

Each entry has room for two company names, three contacts for each address,

and five telephone numbers. The 700-character cap per entry leaves plenty of room for notes.

You've already spent days, maybe weeks or months, putting information into another database program? MyBase protects that investment with utilities that convert information from Traveling SideKick, Little Black Book, Rolodex Label Express, Avery List and Mail, and ASCII-delimited and .sdf files.

To use MyBase you must have an IBM PC, XT, AT, or compatible with 384K of memory. The price, \$89.95, includes a box of paper and two checkbook-size covers. A refill box of paper, with 120 sheets—each able to print four checkbook-size pages—costs \$9 and comes with two covers.

—Jane Hallisey

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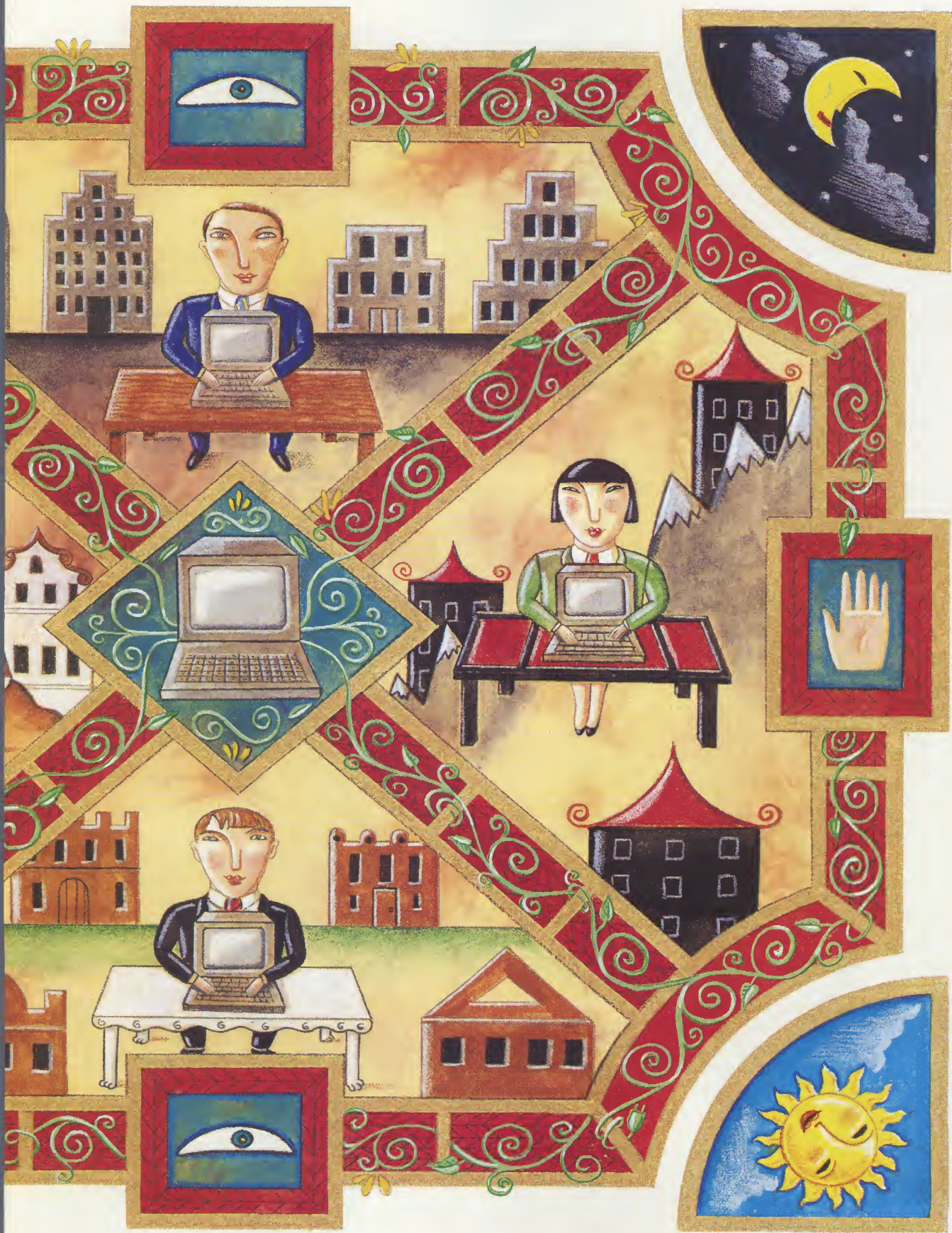
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SOFTWARE makers are busily putting "groupware" stickers on packages as if groupware were a secret ingredient.

in the world—no matter where the experts are.”

Using computer conferencing and electronic mail to identify a problem and speed up its solution has a positive effect in more mundane areas as well, Walling says. “We can now reduce the number of meetings required when assigning a project. And managers at higher levels can look in and review a project, eliminating the need for formal reports. This kind of computer communication represents a significant reduction in cost and an improvement in our ability to solve problems quickly.”

The Idea Behind the Words

“A team to work on a task across time and space”—Walling’s description of this way of working—is more evocative than some of the terms currently in circulation, like *workgroup computing*, *computer-supported cooperative work*, and *groupware*. But whatever name you give it, the underlying idea is attractive, even seductive: groups can have the same power to manage information, communicate, and coordinate work that individuals now have, thanks to PCs. The path to this power is workgroup computing, the next logical extension of personal computing.

But what exactly is workgroup computing? Right now it isn’t much more than a swarm of buzzwords around the bright flower of a fertile idea.

Software makers are busily putting *groupware* stickers on packages as if groupware were a secret ingredient. Yet the wild diversity of the few products currently available—products like Broderbund Software’s ForComment, Action Technologies’ The Coordinator, and Lotus Notes—underscores the status of groupware as a loose set of concepts, hardly a well-defined product category.

Hardware makers are pushing the idea of *workgroup computing* as if it were something entirely new. They’re ignoring the fact that workgroup computing, rather than being a monolithic entity, is a flexible structure with several layers of capability, each layer dependent on those below it for support. They also fail to see, or admit, that the personal computer may represent a move away from the idea of work-

group computing rather than a move toward it.

Academics are hard at work researching what they call *computer-supported cooperative work*. So far, they have not contributed dazzling new technologies; experimental showcase systems tend to be too economically impractical to use today. But their efforts are yielding deeper insights into how groups of people work together, and these insights help to give us a handle on the slippery subject of workgroup computing.

On the Network

Workgroup computing is an undisciplined discipline. Each workgroup organization seems to define it a little differently and to be at a slightly different stage of its development.

The lowest common denominator of groupware is the creation of the group. At Sandoz Pharmaceuticals in East Hanover, New Jersey, that means putting in networks to share applications. The three networks that are going into place there will each link a dozen people at PCs.

It’s not entirely simple, though. The network servers will be Unix machines, because Sandoz is a big Unix shop, according to Jim Cook, the company’s director of information technology. “But most of the tools the senior analysts—the target users—need are PC-based tools for planning, doing cost analyses, and designing documents,” he says. “The benefit of the system will be bringing the analysts together into a common environment for communications and for using these applications.”

Resource sharing like that at Sandoz, to give users access to applications, data files, and expensive peripherals such as laser printers, is the most common reason for putting in a network. This physical connection is the foundation of workgroup computing. But conventional wisdom says that the reason to *keep* a network running is electronic mail.

“E-mail has made a huge change in the way our whole department functions,” says Julian Horwich, who is in charge of PC support for a Chicago-area manufacturer. His department installed an electronic mail system about a year ago. Horwich also serves as executive director of the Chi-

David DeJean is a senior editor of PC/Computing.



cago Association of Microcomputer Professionals.

His department "originally viewed the system as mail," Horwich says, "but what it's become is a decision-making system, a filing system, a group-authoring system. Now we can get more people involved with decisions. Often we can get a decision on something in one morning without even having to have a meeting. The velocity and the quality of our work have both improved."

The quality of the workplace environment has improved, too, Horwich says. "We still have face-to-face interactions during meetings, but the system helps people feel closer to the group. We've included a bulletin board for personal notices, for instance."

Although workgroup computing almost presumes the use of a network, nothing says it has to be a local connection. In fact, e-mail may have its greatest impact on "virtual workgroups," teams whose members are widely scattered and achieve their purposes even though they seldom actually meet face to face.

The National Science Foundation supports research in computers and technology, and it puts what it learns into practice. Laurence Rosenberg, the NSF's program director for information technology and organizations, uses electronic mail to organize task forces: "We have an active e-mail system, and a lot of our business is with our contacts at universities. Frequently we need to organize a workgroup for a particular purpose; when we've achieved the purpose, we dissolve the workgroup."

Rosenberg still uses the telephone and still holds meetings, but the PC he uses makes a lot of what he does possible. "When we have a task to do or a problem to solve, I create a task force over the computer," he says, "and we coordinate our activities, do our report, and get it to where it has to go. When the work is over, the group is, too."

Rosenberg's regard for e-mail as a communications tool is evident. "That kind of stuff isn't novel, it's just turned out to be terribly useful."

More Layers

Layered on top of e-mail in a workgroup network are several specialized applications that are somewhat more novel and arguably less useful. Using electronic

mail as a communications model, these applications perform more specific functions for groups: scheduling and appointment-calendar maintenance, project management, and "conversational structuring"—the name for the syntax of overt requests and responses by which Action Technologies' Coordinator differentiates its messages from the more ambiguous run of general human communication. The Coordinator is a messaging system that incorporates its developers' sometimes controversial ideas on "speech acts"—the requests, promises, demands, and responses people make in communication with one another.

"A package like The Coordinator goes way beyond mail into how the group does what it does," notes Julian Horwich. "The trade-off is that more time is needed to train the people, not just in the technology but in the psychology behind it. This type of software has benefits, but it makes demands too."

Calendaring imposes a similar discipline. "I've seen people jump into using it and then pull out again," Horwich says.

Calendaring can become a battleground where the rights and privileges of the group clash with those of the individual. Although group calendars are meant to facilitate contact, they are sometimes used as a defense against it, with large blocks of time regularly marked off just to keep the time free.

Efficiency and privacy are both at issue. A systems planner for an East Coast insurance company unwittingly bore witness to the problem during a recent interview. "We use e-mail and PROFS on the mainframe," he said as he began to use his company's calendaring system. "You can actually look at your boss's calendar and see where he's going to be tomorrow. I can even look at the chairman of the board's and—that's interesting, there's nothing on it. I'm looking at my boss's boss's boss, and everything's labeled confidential, but at least you know he's busy between ten-thirty and one..."

Problems with calendars are symptomatic of deeper issues, according to Mike Dotson, an ADP planning specialist at the Tennessee Valley Authority. "My concern is that with PCs we are fragmenting the company, fragmenting departments, and making it harder to share information," Dotson says.

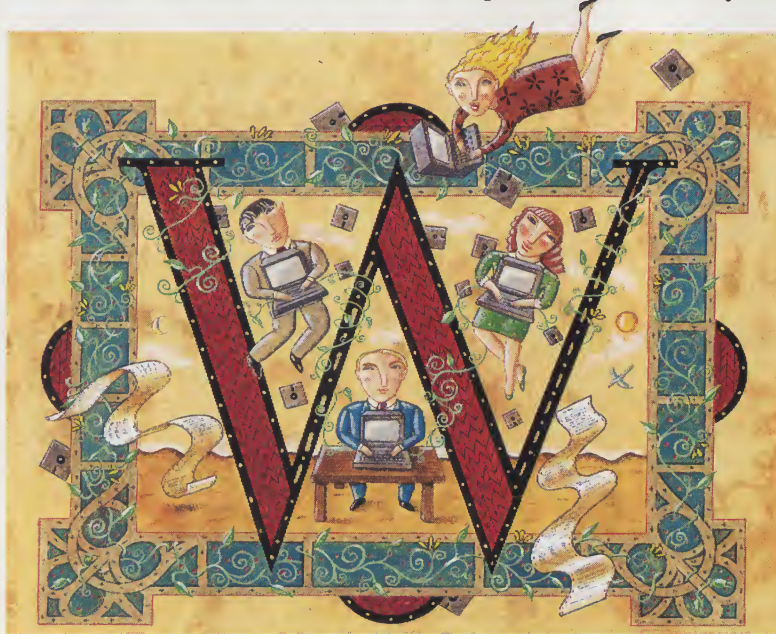
The TVA is divided into three worlds, according to Dotson: the Wang minicomputer world, the PC world, and the mainframe world. "But only the Wang world finds it easy and inexpensive to participate in e-mail," he says. A combined calendar for the heads of Dotson's department was kept as a shared word processing document on a Wang system. "But then the PCs began to come in. They had different calendar packages they liked to use, and the group calendar fell out of use. It's still printed every day and thrown out on a counter, but there's nothing in it. We've slipped back."

Eva Szukala, information resources consultant for

Baxter Healthcare in Deerfield, Illinois, has similar reservations about standalone PC packages. "You've got to be careful," she says. "Some software increases workgroup productivity, but at the expense of individual productivity."

Szukala enthusiastically supports the Coordinator system that has been installed in Baxter's corporate services department for two years. The system has 35 users now, with more scheduled. The biggest problem? "Probably only 5 percent of the people knew how to type. We've had them use typing tutor programs, but many people are still hunting and pecking," Szukala says.

"A system like this one won't work unless it comes from the top down and involves the whole workgroup," she adds. The man at the top, Warren D.



Johnson, corporate vice president of Baxter International, cheerfully admits that that's exactly where it came from.

Johnson, a retired air-force lieutenant general, says that during his military career he bought several large computer systems but hired people to punch the keys. When he brought The Coordinator into his department, he had never typed before.

"Many of my people," he says, "were intimidated for the same reason. And they rationalized it the same way I did: 'You hire clerks for that.' They were intimidated and they resisted. I overcame it by vigorous encouragement and frankly making it very difficult to communicate with me if they didn't use the system."

Johnson recommends The Coordinator to other companies. The most effective aspect of the program, he says, is not the e-mail but the system's built-in discipline.

Also, in Johnson's view The Coordinator fulfills the prediction that computerized communications will flatten management structures. "You find that management at the vice president level is able to manage more directly and more productively," he contends. "For example, although the PC doesn't do away with the need for face-to-face meetings, I don't hold staff meetings anymore. I handle the communications over the PC."

Time and Place

The academic world is generating the clearest understanding of what workgroup computing (or computer-supported cooperative work, or groupware) is.

The definition offered in the article "Groupware: A Key to Managing Business Teams?" by Christine

V. Bullen and Robert Johansen, tackles the complex variety of groupware head-on. Published by MIT's Center for Information Systems Research, the article defines groupware by describing four different "basic business team needs and groupware solutions." The four categories are based on a matrix of place and time: same time/same place, same time/different places, different times/same place, and different times/different places.

Groupware applications in the same time/same place category are probably the most exotic. Few companies have meeting facilities like Colab at Xerox's Palo Alto Research Center, where computers are placed in front of all the participants in a meeting and used variously as shared and private workspaces, blackboards, and voting booths.

Same time/different places applications are only slightly more familiar. Screen-sharing software such as Triton Technologies' CO/Session and Meridian Technology's Carbon Copy lets a remote user dial in using a modem and then look at, and work on, the screen of a local PC. PC-based teleconferencing systems can send both voice and graphics across phone lines to let a speaker address an audience at a distance and illustrate his lecture with graphics.

Bullen and Johansen's different times/same place category includes applications such as team calendars, project management, and text filtering—administrative and text-management applications that can range from the relatively straightforward to the advanced.

Office Works, a new product from DataAccess of Miami, departs from the familiar. It builds some of these administrative support tools on top of an easy-to-use electronic mail system. Each user on the sys-

Irene Greif: The Doyenne of Workgroup Computing

► You can call workgroup computing an off-the-shelf product, a managerial methodology, or a gauzy technological frontier, but it's also a field of scholarship. Indeed, workgroup computing was conceived and pioneered largely within the walls of academe. Irene Greif, now manager of an advanced technologies group at the Lotus Development Corporation, is a leader among the scattered group of scholars who hold its groundwork.

Greif earned a doctorate from the Massachusetts Institute of Technology in 1975 in the arcane area of computer science called "formal semantics." After teaching for a couple of years at the University of Washington, she returned to MIT as an assistant professor.

Eventually Greif began to work in MIT's Office Automation Group (OAG), because she wanted to do work that was "more practical, less mathematical." She began pursuing concepts that have emerged as workgroup applications: shared calendars and authoring, and real-time conferencing.

"What I started to realize was that a lot of the technology that we need to support collaborative work is pretty well understood already," she recalls. The important breakthroughs, she felt, were going to come from integrating the technology, from "thinking about it from the point of view of the group instead of from that of the individual."

With sponsorship from Digital Equipment, MIT hosted a workshop in 1984 on topics the OAG was exploring. Greif was cochairperson for the meeting. The task of writing the invitations brought a name for the emerging discipline to the surface.

"When we wrote to people, 'We think you're doing computer-supported cooperative work; would you like to come?' they all came," Greif recalls.

And no matter how unwieldy, the name *computer-supported cooperative work* stuck.

The participants spent most of the workshop just grappling with the astounding diversity of disci-

trying to get a handle on those group features."

But Greif's interest wanes when the conversation turns to specific software. Though she has a rich knowledge of products that are on the market and on the chalkboard, she seems more eager to talk about the role of, say, organizational behaviorists in designing groupware than about individual programs.

Greif remains guardedly optimistic about the place workgroup computing is forging for itself. Workgroup computing is "not a panacea," she says. "It will raise the level of creativity, but it still faces barriers, especially in nonbusiness uses. Also, [groupware] makes a lot of informal interactions more visible, and both organizations

and individuals may abuse this capability."

Greif is chairing a third conference, scheduled for late September in Portland, Oregon. In the four years since the first CSCW workshop at MIT, the relative importance of computer technology has diminished. In putting together the program for Portland, she says, "we've seen quite a shift toward social science and papers that are trying to get a grasp on what collaboration really is about."

Because PCs are pervasive and relatively inexpensive, they're a prime testing ground for these ideas, a fact not lost on Greif: "The sooner we start to get products in front of people, the sooner we're going to start understanding what really happens in groups and how we should be designing those products."

—Marty Jerome

Jerome is an associate editor of *PC/Computing*.



plines that computer-supported cooperative work, or CSCW, seemed to include. But the new field was off and running.

Two years later, in 1986, Greif chaired a conference in Austin, Texas, attended by about 300 people. Its success caught the attention of the computer industry, and software makers began thinking about actual products. In 1987 Lotus persuaded Greif to enter the private sector.

At Lotus, Greif now works with products under development—including Lotus Notes—and with products already on the market. She sees her role as that of a consultant, "a link to the research field."

Exhibiting a scholar's rapport with her subject, she is forthcoming about CSCW's concepts, its problems, and its prospects. "Groups have certain conventions about how they will work together: who's in charge, who gets to change the database, and so forth," she says. "We're

tem can maintain a personal calendar, and a user who wants to schedule a meeting can specify a time and attendance list, then see a block diagram that represents how many of the people are available (without revealing which ones). A couple of database formats are hard-coded into Office Works to let its user group build shared files of names and addresses and of materials stored offline, such as documents and photographs.

Information Lens, on the other hand, comes out of the left field of theory and experimentation. The system, developed at the Sloan School of Management at MIT, applies some elements of artificial intelligence to help manage high volumes of electronic mail. The Information Lens offers users several types of message forms and lets them write rules about the forms. For example, a rule might say, "If this message is a meeting announcement form from my boss for today or tomorrow, send a meeting acceptance form and move this message into my 'urgent' file." The Information Lens runs on Xerox workstations, and it uses the machines' graphical interfaces.

The fourth category, different times/different places, includes groupware for tasks that require ongoing coordination, including group writing projects, computer conferencing, and what Bullen and Johansen call "conversational structuring." The applications in this category include those The Coordinator can handle, enforcing workgroup communications rules that require group members to be formal and explicit in their commitments.

An Unresolved Issue

Although Bullen and Johansen's matrix approach helps to clarify what groupware applications can be, it doesn't resolve what might be called the issue of collaboration versus coordination.

One school of thought says that individuals, not groups, do work, and that therefore the proper role of groupware is to coordinate the work of individuals: to send messages, record meeting schedules, keep track of deadlines, maintain records, and so forth. Richard Goldner, product development manager for Office Works, calls products fulfilling this role *horizontal groupware*, because their functions reach beyond the activities of individual group members and computer applications to manage the interaction among them.

Office Works is one entry in this category, and Lotus Notes may be another. (Still in development, Notes will combine workgroup computing tools with some of the capabilities that Lotus's single-user program Agenda uses for managing unstructured information.) The ability of these applications to build files that all the members of a workgroup share gives them the potential to become the repository of group memory, the shared history of the group.

And to the extent that an application of this type

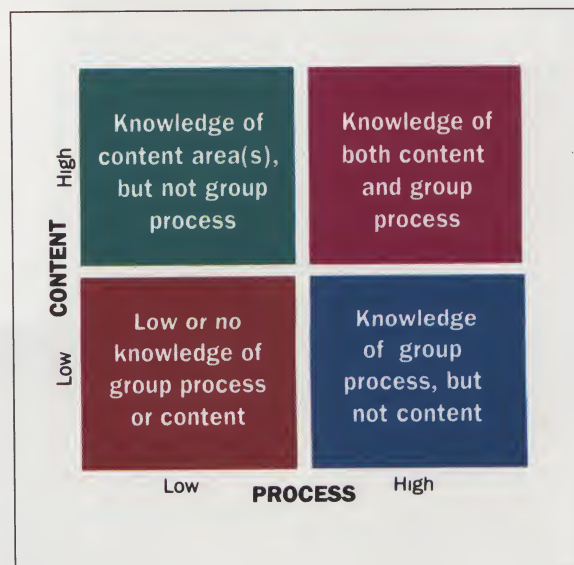


embraces the "conversational structuring" principles of The Coordinator, it can even be seen as the group's conscience, the chronicler of the group's decisions, and the reminder of its responsibilities—as well as the keeper of its scores.

But another school of thought says that groupware should be more than a kind of digital Jiminy Cricket; that the goal of all workgroup computing should be to allow users to work in an electronic environment that other users can share, just as we work in a physical environment in meetings and on paper. Goldner calls groupware that accomplishes this goal *vertical groupware*.

ForComment is one of the few examples of vertical groupware in the PC world. As another example of vertical groupware, Bullen and Johansen cite Metaphor, a mainframe system that supports the work of brand-management teams in the marketing departments of consumer-goods makers.

Bullen and Johansen approach the issue of coordination versus collaboration by drawing another matrix. They identify two main characteristics of group work: process (the way a group interacts) and content (the subject matter, the work to be done). Then they rate each capability built into groupware applications



THE kind of managing that takes place across a desk is basically different from that which takes place on a computer.



according to the degree of understanding that characterizes it.

Electronic mail, for instance, rates as low/low. It embodies no knowledge of either the content it carries or the processes that the group it serves uses to do work. The Information Lens, on the other hand, is in the high/high category. Its use of message types and user-written rules gives it some knowledge of both the content and the processes.

The groupware products that rank high in knowledge of group processes but low in knowledge of content make strange bedfellows: Lotus Notes, The Coordinator, ForComment, and Xerox PARC's Colab. Obviously, this odd mix of hardware and software, commercial products and research projects, and horizontal and vertical groupware applications is where the action is today. And clearly the movement is toward the high/high box, where intelligent applications do the filtering and filing and administrative work, serving as automated executive assistants to users sharing an electronic work environment.

New Rules

But groupware isn't there yet, and the danger is that its makers will promise too much.

Workgroup computing is not a panacea. The explicitness built into products such as The Coordinator really does only what good managers have always done. These products are specific about assignments and expectations, create objective criteria for judgments, and deal forthrightly rather than beat around the bush.

Putting an automated version of what good managers do into the hands of bad managers won't make them good managers. Bad managers may use the explicitness of an automated system to depersonalize the process. The risk is that if the messages can be modularized (as message types or speech acts, for example), managers will view the message recipients as modular as well.

Author and consultant Tom Cross, whose firm Cross Information markets computer-conferencing and security products, cautions that groupware may require new methods of management: "It's a different kind of communication that goes on there. I'm

not sure that we're ready for it psychologically yet."

Cross says the kind of managing that takes place across a desk is basically different from that which takes place on a computer. "It's like the two kinds of rules for piloting a plane," he explains. "There are visual flight rules, or VFR, and instrument flight rules, IFR. I think most of us in business today have been trained in VFR; we're not really used to dealing in an environment that's not face to face."

What those new rules might be will be the subject of much research. Other questions are being posed as well. For example, does workgroup computing really produce the best-quality product? After all, the camel is said to be a horse created by a committee. Can groupware improve the performance of committees?

"It's hard to say that by enhancing the capability of the group you'll find the genius, the Einstein, and get that level of achievement," says Irene Greif, manager of an advanced technologies group at Lotus Development that focuses on workgroup computing and networking.

Another of Greif's concerns has to do with the perceived need for formally defined groups. She feels that the focus on fixed sets of people masks a need for dealing with ad hoc groups and one-time problems.

"My organization, for example, has a number of people whom I don't know but that I may need information from," Greif points out. "And at times I may have information others could benefit from; if I could place the information in a knowledge base, it would be more useful."

"Workgroups might seem like they can get by with e-mail, but that means that I have to know the person I'm communicating with, and that's not always the case, especially in big organizations."

The Future

Greif coined the term *computer-supported cooperative work* four years ago, when she was an assistant professor at MIT and organizer of the first meeting on workgroup computing.

Her perspective is one part research scholarship and one part software entrepreneurship. Although Greif comes from the academic world, she feels that



PUTTING an automated version of what good managers do into the hands of bad managers won't make them good managers.

laboratory investigation of workgroup computing has been too restricted. She maintains that only with the availability of commercial software for PCs—products like the ones featured in this issue—are we beginning to see the lay of the land.

"A lot of studies have been done on what happens when a system like The Coordinator, which I don't love but real people buy, goes into an organization," says Greif. "And you've got products like Lotus Notes going out into real settings with real people. That will make a difference in our understanding, so that a couple of years from now the products that come out will be based on the sort of real experience that the research labs have not been able to supply."

Victor Walling has a different perspective as a strategic planner for information and computing, yet his conclusion is much the same. "We're just discovering what this thing is good for," Walling says. "Just because you've got paint and a paintbrush doesn't mean you're going to produce a Mona Lisa."

ForComment

Tired of circulating drafts for review and getting back scribbled comments and long memos? Relief is in sight.

By PAUL BONNER

THE SOFTWARE MARKET can be disillusioning. Dealer shelves are packed with look-alike word processors, spreadsheets, and flat-file databases, but programs that embrace PC technology in new ways appear all too rarely.

And when groundbreaking software does appear, it often languishes on the shelves as more easily classified packages roll out the door. It's easy for a salesperson to tell someone, "Quattro is like 1-2-3, which is like Multiplan, which is like VisiCalc." For a program that does something really new, however, there is no easy answer to the "What's it like?" question.

Such is the case with Broderbund's ForComment.

Although ForComment has been available for almost two years, it remains largely unknown, chiefly because the quick answer to "What is it?"—a group writing tool—provokes puzzled looks more often than buying interest. That's a shame: ForComment introduces a software concept that deserves notice.

ForComment executes its underlying premise—that a PC can help to create and refine documents that require the thoughts of more than one person—so well that almost everyone whose trade requires putting words onto paper should find it an invaluable tool. Where the program truly shines is in preparing legal papers, business reports, proposals, scripts, and program code.

ForComment is not a word processor, however. Although the program offers a limited-capacity (4,000 characters) text editor, it's primarily intended for use with ASCII text files created with standalone word processors. The excellent ForComment user guide details how to import and export files from 25 leading word processors.

The person who creates a ForComment document by importing a text file is designated as the document's author. Everyone else who uses ForComment to suggest revisions or additions to the document is a reviewer. The program maintains each reviewer's suggestions separately from the original document; only the author can change the original.

The author begins the ForComment process by creating a circulation list and distributing his document to the reviewers. On a local area network, the ForComment file can simply be put into a shared volume to which all the reviewers have access. Without a network, distribution has to be done the hard way, by copying the document onto floppies, handing them out to reviewers, and then collecting them once the review process has been completed. The latter method works, but if you're going to use ForComment a lot, you may have just found a good reason to install a network.

After a document has been distributed, all the reviewers can read it and enter their comments or revisions in the electronic equivalent of its margins. ForComment uses a colorful split-screen approach:



A marker appears in the text at each point where a comment has been made. When you place the cursor on a marker, the corresponding comment appears at the bottom of the screen. Each color-coded comment or revision is identified by the initials of the person who made it and the time and date it was made. A two-line, Lotus-style menu appears at the top of the screen.

The result is an effective but somewhat cramped display, in which only ten lines of the original document are visible at a time. The program would be better served by an environment that allows resizable and scrolling windows, such as that of the Macintosh or the Microsoft Windows Presentation Manager.

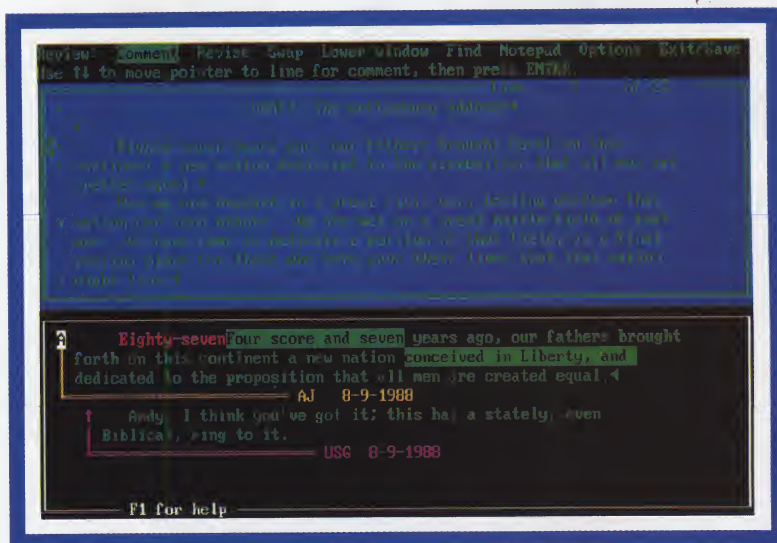
Once every reviewer has had a chance to take a whack at the document, the author can collate the comments with a menu command and choose which

suggestions to incorporate. At that point, a second round of editing and commenting can begin, or the author can move the document back into the word processor in which it was created, print it, and send it on its way.

By incorporating a simple user interface, a strong help facility, and a good disk-based tutorial, ForComment makes the process of group writing and editing simple to learn and, at least on a LAN, easy enough that it can become a natural extension of the business writing process.

The exciting thing about ForComment is that it allows author and reviewers to react to one another's comments and thus to produce a document that reflects the sum of their knowledge and insight into a subject. Ideas can spark more ideas, resulting in a better piece of writing than any one team member could come up with on his own—or than a committee could produce by scribbling marginal notes on paper copies.

Yet a danger lurks in the process, one that reflects the corporate culture for which ForComment is intended. Too often, the participation of many individ-



uals in the process of writing can lead to watered-down phrases and excessive caution where boldness is needed.

On a more practical level, ForComment's ability to work with any ASCII text file adds versatility, but the program would be easier to use if it were linked to a single general-purpose word processor. As it is, ForComment ignores formatting commands in the text files it imports, and it can't do much with special word processing features such as footnotes and multiple columns.

A product that breaks as much new ground as ForComment almost inevitably results in a wish list of additional features from everyone who uses it. I'd like to see a Macintosh version, and I'd like the program to function as an extension of Microsoft Word or WordPerfect, with support for those programs' special features.

Still, ForComment is noteworthy and praiseworthy for recognizing and exploiting the PC as an aid to the group writing process. It extends the range of both the PC and its user—exactly what great software should do.

Paul Bonner is a senior editor of PC/Computing.

ForComment

List Price:

\$295; network group version, \$995.

Requires:

256K RAM, two disk drives (hard disk recommended), DOS 2.0 or later.

In Short:

This groupware program lets individual reviewers simultaneously enter comments or revisions on a single document, much as they would put marginal notes on a hard copy draft. It's a great help in preparing legal papers, business reports, proposals, scripts, and program code.

Broderbund Software
17 Paul Dr.
San Rafael, Calif.
94903
(800) 492-3500
(415) 492-3200

The Coordinator

When workgroup computing goes wrong, The Coordinator becomes The Oppressor.

By JIM SEYMOUR

ELSEWHERE IN THIS issue, columnist John Dvorak worries that workgroup software will create too many echoes of Big Brother, introducing into the workplace oppressive and unnecessary monitoring of workers' actions. And a computer-industry sage some months ago tagged Action Technologies' Coordinator—one of the first commercial workgroup packages—"fascist software."

Unfortunately, The Coordinator lives down to those expectations.

One of the most common failings in interpersonal communications is lack of clarity. A close second is lack of follow-through on commitments made in those flawed communications. Often the latter follows, perhaps inevitably, the former: if I told you I'd do A, but you think I said I'd do B, then both of us are going to be dissatisfied with my actions.

That kind of miscommunication is common in any business setting, and the resulting failure of mutual expectations can be disastrous. Of course, sometimes



forces participants to be explicit about what they ask others to do, about what they agree to do for or with others, and about when they agree to have it done.

Although The Coordinator succeeds in creating structure, it also succeeds in making me feel uneasy as it tries to form my human exchanges into cold contracts. That may be fine for the wildly disorganized, but the people I work with are pretty good about not saying yes until they know what they're agreeing to. And while they may need a gentle push now and then, they don't need a master standing over them with a digitized whip.

The Coordinator, I fear, thinks they do.

Log on to The Coordinator (by typing ATC) and you'll get the starting menu, which seems straightforward enough. Some of the choices include Today's Actions (read new mail, appointments and commitments, future appointments, commitments due today, and notes), Conversations, and Long-Run Calendar.

Go one layer deeper and you start getting into The Coordinator's linguistic gamesmanship. Say you want to initiate what The Coordinator calls a Conversation with someone in your workgroup. Conversations are in this context either Requests, in which you ask someone to do something, or Commitments, in which you respond to someone else's request. Your response, of course, is always governed—as Action Technologies loves to remind us—by your acceptance of the conditions that the initiator of the exchange has placed on his request, and is contingent as well on the other person's acceptance of your conditions. Whew.

But it gets worse.

You can open a Conversation for Action, which is the kind of offer-acceptance exchange outlined above. Or you can open a Conversation for Possibilities, which is how you propose to noodle around about something you'd maybe like to do. The manuals define the latter as "a Conversation that typical-



my failure to do what you expect me to do isn't a matter of misunderstanding; it may be that I'm sloppy about making commitments, and keeping them.

The Coordinator, which is like an elaborate electronic mail system for workgroups, tries to bring structure to workgroup exchanges in a way that

T H E camel is said to be a horse created by a committee. Can groupware improve the performance of committees?



ly seeks to achieve agreement about a realizable possibility or a possible course of action."

Beam me up, Werner.

Somewhere in the middle of all this psycholinguistic structure is a piece of software, and in fairness I should say that the program runs as promised: the screens are well designed and readable, and the function-key assignments are intelligent (and mapped to the bottom of the screen, as they should be in many more programs). Online help—unfortunately called "coaching"—is extensive. Also, a built-in word processor writes plain-ASCII files (ah, bliss!) that you can use with other programs.

But The Coordinator asks you to spend far too much time wallowing through its inherent clumsiness in endeavors such as Changing the Domain of a Conversation, dealing with Conversations I Am Observing, handling Alien Conversations, and—my favorite—dealing with the Master Purger.

Give me a break.

When I was working with The Coordinator, a fellow PC enthusiast wandered in and asked what I was doing. I described The Coordinator as an example of the new world of workgroup computing software, and took him through some of the steps of a Conversation.

His reaction moved from disbelief to dismay to disgust. "If that's the Brave New World of groupware," he said, "give me an old two-floppy 256K PC and a copy of WordStar. I haven't got time for that kind of nonsense."

Me neither. And that's a Commitment.

The Coordinator reflects a great deal of serious and often thoughtful work on the nature of interpersonal communication, and on what leads to successes or failures in shared-work settings. It's a serious piece of software coding, spread over six 360K floppy disks. And it takes its work seriously.

But in the end, The Coordinator's deadly earnestness is what defeats it on the human level. While it may seek, gather, store, and remind us of our commitments tidily, it makes our lives smaller, not larger. That's not a prescription for software that will make anyone, or any group, more productive.

Jim Seymour is editor-in-chief of PC/Computing.

The Coordinator Version 1.6

List Price:

\$495 for single-copy standalone version; \$995 for 50-workstation LAN version; \$395 for 50-user expansion.

Requires: 640K RAM.

In Short:

One of the first commercial groupware programs, this package, similar to an elaborate electronic mail system for workgroups, forces users to be explicit about what they ask others to do, what they agree to do for others, and when they agree to do it. Although it's serious software with good work behind it, the program is too rigid in its structure and quickly becomes dictatorial.

Action Technologies, Inc.
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11th floor
Emeryville, Calif.
94608

(800) 624-2162
(415) 654-4444

Lotus Notes

**Will this program be the 1-2-3
of workgroup computing?
Lotus is betting money on it.**

By PRESTON GRALLA

IF LOTUS DEVELOPMENT has its way, Lotus Notes will revolutionize how people interact in the workplace in much the same way that Lotus 1-2-3 revolutionized how people use numbers.

But that achievement, even by Lotus's reckoning, will take some time. Although other companies have jumped feet first into the workgroup marketplace, Lotus has opted for an extended testing and design phase. The product will not be available until sometime next year.

Indeed, by the company's own lights, Notes can't even formally be called a product yet. It's currently in the hands of corporate testers, whom Lotus calls "applications partners" rather than beta sites. Lotus claims that the partners' role may go beyond simply uncovering bugs and that the product may be redesigned in accordance with the testers' suggestions.

Although the company won't reveal precisely how Notes works, it will say that the program now runs under Windows (admittedly sluggishly) and that

when it is released it will run under Presentation Manager.

Because of Lotus's we-will-show-no-software-before-its-time policy, the firm is not offering previews of the product. But company officials have revealed Notes' underlying philosophy and specific applications for which its testers are using the program.

"In the broadest sense," says Lotus vice president David Tarrant, "Notes will address things that peo-

Eric Sall, Notes' product director, adds that Lotus's testers are using Notes for tracking sales leads. The program supplies "a running history of every phone call, meeting, and letter. When someone new comes on board, you just point them at the file, and they're automatically up to speed."

Also, in place of using the time-honored three-ring binder, some of the testers are using Notes to maintain policies and procedures manuals.

The program will allow users to attach non-Notes files to Notes files. So, for example, a Notes conference about a company's financial outlook may have a 1-2-3 spreadsheet about corporate finances attached to it. Users can then add that spreadsheet to their own files.

An important aspect of the program, according to Sall, is that it allows people in far-flung locations to communicate, since it works across local area networks and servers.

Notes will handle access and security issues by assigning different access privileges. Some users may be able to write comments in a file but not alter what anyone else has written. Others may have read-access privileges only. Still others may be allowed total access, so that they can control

the direction in which the discussion heads. Administrators will be able to customize access privileges for each file, so that a person may have write-access to one file, read-access to a second, no access to a third, and total access to a fourth.

While Notes will most likely offer canned applications for such tasks as conferencing and tracking sales leads, its real strength will be its flexibility, Lotus officials believe. They are currently struggling with how to give the program maximum flexibility while still making it easy to use.

Developers at Lotus are so enthusiastic about their new program, you can almost hear messianic overtones in their speech.

"We see Notes as transcending computer systems," Sall says. "It's about how organizations work. The question has been asked, 'Should your product change the way people work?' We believe that it should allow the change, but not force it." ■

Lotus Notes In Short:

Currently in the hands of corporate testers, this groupware product is scheduled for release sometime in 1989. Running under the Presentation Manager, it will enable people to conduct a "shared conference," manage development projects, track sales leads, and maintain policies and procedures manuals.

Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, Mass.
02142
(617) 577-8500



ple do at work every day, and the most prevalent thing people do at work is communicate with one another." Tarrant believes Notes will allow workers to communicate more clearly and easily by computer than by more traditional means.

One example is what Tarrant calls the "shared conference." Under Notes, everyone in a workgroup would have access to a common file—"like sitting around a conference table," he says. People would use the program to jot down ideas, have conversations, post agendas, put in status reports—all the things normally done in meetings. They could then browse the file at their leisure. Without having to perform "housekeeping" chores face to face, they could reserve meetings for more important matters. "Notes won't replace the meeting, but it will allow meetings to become more efficient," Tarrant says.

Product development is another area within Notes' purview, Tarrant says. Lotus is using the program to manage its own development projects, including the development of Notes itself.

"You may have five to ten people on a design team, but hundreds of early users within the company who have ideas about the software. You set up a Notes file so that those people can contribute ideas and the developers can browse through the file."

Preston Gralla is a senior editor of PC/Computing.

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25	Rdy	Radiology Transcripts	01 22	18 24	1	STD	66	N	1	2
4	Rdy	Infection Control Report	01 22	15 02	5	STD	66	N	1	69
27	Rdy	Emergency Room Schedule	01 23	20 10	5	STD	66	N	20	2
30	Rdy	PRINTQ	01 23	22 08	5	STD	66	N	1	1
32	Rdy	SYMMA	02 10	19 23	5	STD	66	N	1	1
26	Rdy	Medicare Reimbursement	01 23	21 00	5	2pt	66	N	1	26
28	Rdy	Laboratory Reports	01 23	20 00	5	STD	66	N	2	2
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Laptop Survival:

TRICKS, TIPS & TRAPS

Hard-earned wisdom from years on the road.

By BILL HOWARD

When you take your portable PC on the road, you just snap the lid shut, grab the handle, and off you go, right?

Not if you plan to get any serious work done. Laptops and other portables fare best when you supplement them with a half-dozen well-chosen accessories that help you cope with the realities of life on the road. These realities include:

- hotel telephones with no apparent place to plug in your modem;
- 3½-inch disks in your laptop, 5¼-inch disks in someone else's PC, and a need to swap data;
- wanting to leave behind hard copies;
- needing to run a demo on a color monitor (when you haven't brought one along);
- yearning for access to the fax and telex facilities you take for granted back at the office;
- limited battery life on serious portables;
- the airlines' limit of two carry-on bags.

A road warrior's black magic kit will add a few pounds to your portable, but the essentials, except for the bail bond certificate, can be obtained at Radio Shack for under \$50. To do everything described in this article, you'll need about \$1,000, but you'll be able to do everything short of bouncing data off a geosynchronous satellite—including sending faxes and telexes.

ILLUSTRATION BY RENE ZAMIC

What follows is a compendium of hard-earned wisdom from several years on the road with a variety of portable PCs.

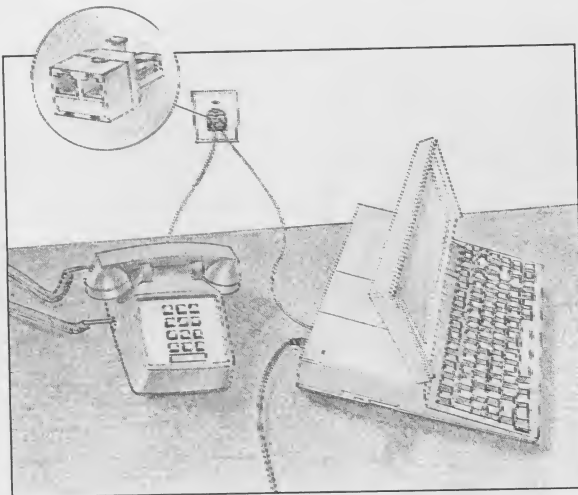
Honesty Beyond the Hudson

First, if you haven't done it yet, tape your business card to the side of your portable. And add these lines to the end of the Autoexec.bat files on your hard disk and to any self-booting floppy disks:

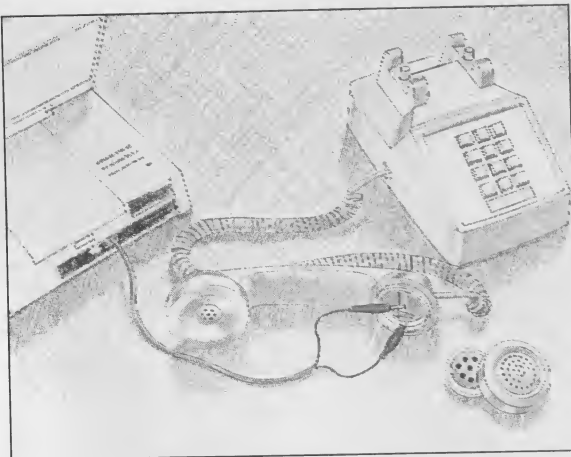
```
rem-IF FOUND, PLEASE CALL  
rem-[Your name and address]  
rem-[Your telephone number]  
rem-REWARD
```

Although New York residents believe Diogenes is still out searching, Good Samaritans outside Gotham may return your belongings if you give them a chance.

While you're at it, create a help file that lists all the odd keystrokes that do special things on your portable—the key combinations that turn the modem on and off, enter the system setup, change video attributes, and switch from your portable's screen to the external monitor, for example. Paste a printed copy on the bottom or back of the unit as well. Too many portable PC makers have 2-pound manuals and no reference cards.



- 1 Use a duplex jack (the Y-connector) to plug in the phone and the modem at the same time. The phone cord may disappear into the wall and appear to be hard-wired, but removing the plate may reveal an RJ-11 jack.



- 2 If your room has no plug-in jack, unscrew the mouthpiece. Take your 12-inch cable with alligator clips attached and connect the red and green wires to the two silvery mouthpiece contacts. Then dial.

Communicating on the Road

If you want to stay in touch when you're out on the road, that most likely means calling an electronic mail service from your hotel. Try to stay at better hotels, because as the room rates go up, so do the odds the telephones will have modular clip-in plugs at one or both ends. The buzzword for these plugs is "RJ-11," the telephone industry's name for that near-ubiquitous connector for one- and two-line phones. Some hotels may even have data ports (additional RJ-11 jacks) on their phones. You can call ahead and ask about modular phone jacks, but if you do you'll likely be greeted by a "Whuzzat? Lemme transfer you to someone who might be of help" and a grand tour of housekeeping, maintenance, room service, and the assistant manager's office before you're unceremoniously cut off en route to housekeeping for the second time.

But even if your hotel lacks RJ-11 jacks or data ports, you can connect a makeshift but generally effective clip-on cord to the telephone system. You can find the parts at discount stores, telephone company phone stores, or electronics parts stores. Your best bet is Radio Shack: odds are good that the pimply 17-year-old clerk with the glasses held together by a safety pin knows more about *practical* electronics than the head of Bell Labs. Explain what you're up

to, hint that you think it's mostly legal (and wink), and he'll be a willing partner. If he's not busy, he might even help you crimp the two connectors into place. You'll need:

a modular duplex jack (Radio Shack Part No. 279-357, \$4.95). This Y-connector lets you plug two telephone cords (phone cord and modem cord) into one telephone jack.

a modular line cord (\$1 to \$6). This is a telephone cord with RJ-11 plugs at both ends. Choose coiled or straight cords in lengths of up to 25 feet. *Caution:* Don't buy the modular handset cord that goes between the phone and the handset (the plugs will be too big).

an in-line coupler (Part No. 279-358, \$2.49). This tiny connector with RJ-11 jacks at each end makes one long phone cord of two shorter ones.

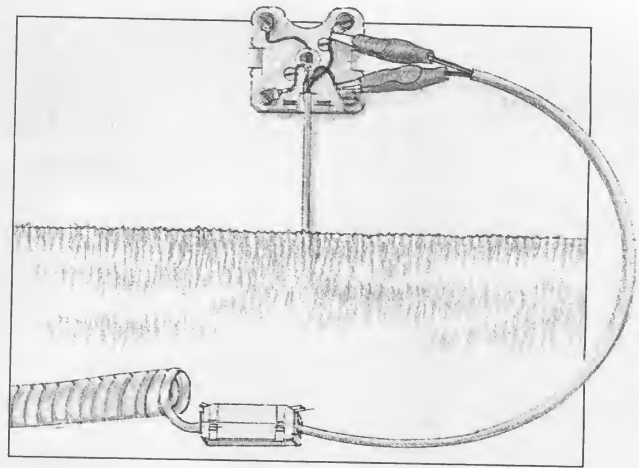
a homemade attachment cable. To fashion this special cable, you'll need alligator clips (Part No. 270-378, \$1.29 for 10; they look like miniclothespins with steel teeth) and a 12-inch modular-to-spade line cord (Part No. 279-391, \$1.99), which has an RJ-11 plug at one end and four wires with spade lugs at the other. Take two alligator clips and crimp them (with pliers) or solder them onto the red and green wires of the cord (ignore the yellow and black leads). This short cable can be attached to vulnerable parts of systems that don't have RJ-11 connectors.

a small, flat-bladed screwdriver or Swiss Army knife for coping with the innards of the telephone and the wall jack.

Bill Howard is an executive editor of PC Magazine. He holds the record for most hours spent using a laptop computer on the Raritan Valley, New Jersey, railroad line.



- 3** If the signal through the phone is poor, remove the phone case and attach the red and green cable leads to the red and green transformer wires. Then use a rubber band (or the handset) to hold down the switchhook.



- 4** Another method is to connect the cable to the wiring block behind the telephone wall plate, red lead to red wire, green lead to green wire. Use the in-line coupler and the extension line cord to hook up to your portable.

an AC extension cord to add another 10 feet to your portable's power cord.

a miniature flashlight for working under the bed. Tekna makes a tiny one with a powerful lithium battery.

Here's how to proceed.

Try the path of least resistance first. If the telephone or the wall jack in your hotel room has RJ-11 connectors, use them. You use the duplex jack (the Y-connector) to plug in your phone and your modem at the same time. Sometimes the phone cord disappears into the wall and appears to be hard-wired, but if you remove the wall plate, you may see a free-standing RJ-11 jack inside.

Also, check the bathroom telephone, if your room has one. Over the past few years, several laptop-toting *PC/Computing* editors have accomplished two tasks simultaneously in the early morning in hotel bathrooms. Elegant, no, but more productive than sitting there with your complimentary copy of *USA Today*. Slide the locking lever (on the base plate) up or down, then ease the phone up and off the wall hanger. This may require a good tug, and the first few times you try, you may think you're about to rip the phone off the wall. If the phone does come off, you'll find an RJ-11 jack on the wall.

If your room has no plug-in jack, the next-easiest access is through the telephone mouthpiece. When you unscrew the mouthpiece, the carbon microphone inside will pop out and you'll see two silvery contacts. Take your 12-inch cable with alligator clips at-

tached and connect the red and green wires to the mouthpiece contacts. When you're ready to call, lift the handset from the receiver and dial away. Your modem's autodialer should work. You may have to program a delay between dialing 8 or 9 for the outside line and dialing the rest of the number. Start with two seconds and use commas to indicate delays. For instance, AT DT (modem: attention, dial) 9,,1-202-456-1414 will ask for an outside line, pause two seconds, then dial the White House.

If you have a standard AT&T-style handset and the mouthpiece unscrews, you can attach two specialized connectors—rubber disks with RJ-11 plugs in the middle—to the mouthpiece and connect them using your extension line cord. Two versions of these connectors, BlackJack and Modem Mouth, are now available. Both are \$49.95 from Traveling Software, 18702 N. Creek Pkwy., Bothell, Wash. 98011, (800) 343-8080 or (206) 483-8088. Both screw on to the handset. (Traveling Software, by the way, is a prime source of laptop information and accessories.)

If the quality of the modem signal suffers as it goes through the telephone, you'll need to tackle the inside of the phone. Remove the phone case (two screws on the underside) and find the transformer block (it's the part with the maze of wires attached). Attach the red and green leads of your alligator-clip cable to the red and green transformer wires. Then put the handset back on the hook; you'll have to balance it upside down (or use a big, strong rubber band to hold down the switchhook).

What if you can't or don't want to take apart the telephone, and there are no RJ-11 jacks in the room? Brush aside the industrial-strength dust bunnies that breed under hotel beds and undo the telephone wall plate with your screwdriver to expose the wiring block. Then connect your special cable (the modular-to-spade line cord with alligator clips attached), red lead to red wire, green lead to green wire (you don't need the yellow and black leads). Use the inline coupler and the extension line cord to hook up to your portable.

One last direct-connect method involves minor damage to the telephone lines. Let's discuss it for educational purposes only: take your Swiss Army knife and scrape the insulation off the phone cord until you expose the wires inside, then attach the cable with the two alligator clips and dial away.

What about the legality, propriety, and safety of all this? A Federal Communications Commission rule, honored mostly in the breach, requires that you call the telephone company before attaching anything to the phone. No one does. Hotel staffs see plenty of travelers using portables, and a few extra wires looped around the phone aren't cause for alarm. Besides, phone systems are rugged; you're unlikely to hurt the phone, your portable, or yourself, no matter what you do.

Even if you try every trick in the book, you may come up against a system such as a digital PBX that's incompatible with your portable and modem. As a last resort, try an acoustic coupler. This is a device that looks like a puffy rubber cradle for the handset. You connect your portable to the modem, and your modem to the acoustic coupler by a telephone extension cord, and you put your phone handset into the

**If you really want
a take-along printer,
try the battery-powered
Diconix 150
ink jet printer.**

coupler's rubber cups. The most widely available acoustic coupler is at (you guessed it) Radio Shack (Acoustic Coupler 2, Part No. 26-3818, \$59.95). You're limited to a message speed of 300 bits per second, about 30 characters per second, but slow messages are better than none at all. Acoustic couplers also work with pay phones.

And don't forget about the business centers in better hotels. They may have PCs, modems, or modular jacks you can use.

To communicate with the widest range of people, the best bet is MCI Mail. For \$18 a year plus message charges (\$1 per 7,500 characters), you can send messages to other MCI Mail users and other e-mail

systems (CompuServe and the Source). Through MCI you can also post telex messages, send overnight paper mail posted as late as 11 P.M. (\$9), and send postal service paper mail. MCI expects to add a PC-to-fax service this fall. You send the message and a telephone number to MCI Mail; MCI then forwards it to a fax machine. For details, call MCI at (800) 444-6245 or (202) 833-8484.

Cheaper Modems

If you buy an internal 1,200-bps modem from the same company that makes your portable, you could pay up to \$400. But an external modem the size of a cigarette pack costs half that, and it can do double duty as the modem for your desktop PC. Three external modems to consider: the 7-ounce WorldPort 1200 and WorldPort 2400 (bps), \$199 and \$359 list price, respectively, both from Touchbase Systems of Northport, New York, and the slightly larger Pocket Modem from Migent Software of Incline Village, Nevada, at \$159. (The Migent, which has a gorgeous red plastic shell, is one of the few pieces of computer hardware that doesn't look like a squared-off beige lump.) And if you're traveling beyond North America, be sure to get a modem that supports both Bell (U.S.) and CCITT (elsewhere) standards. The Touchbase modems do.

If your life revolves around fax, check out the \$495 JT-Fax Portable from Quadram Corporation of Norcross, Georgia. It plugs into your serial port, accepts data files from your portable, converts them to the industry-standard Group III fax format, and sends them on to a fax machine. It also can receive faxes: you view the fax on your screen or make a printout. Operating at about a page a minute, the JT-Fax portable is half as fast as Group III machines, but what do you expect from something the size of a Hewlett-Packard portable calculator?

Traveling Printers

Need a paper copy of your work? The best system is also the cheapest: borrow a printer at your destination. You'll seldom be turned down. Three word-processor printer drivers will cover almost every printer commonly available, and you should take them along: Epson FX or the similar IBM Proprinter; HP LaserJet; and lineprinter (also called TTY or generic). At the least, you'll get boldface and underlining to come out properly. Do carry a printer cable (parallel), since the backs of desktop PCs are seldom readily accessible. To save weight, look for a flat ribbon cable.

Alternatively, send yourself or your hotel a fax using your portable fax unit, use MCI's PC-to-fax utility, or send yourself MCI overnight paper mail. (A word of caution: MCI couriers are slow to deliver in some areas.)

If you really want a take-along printer, the \$499

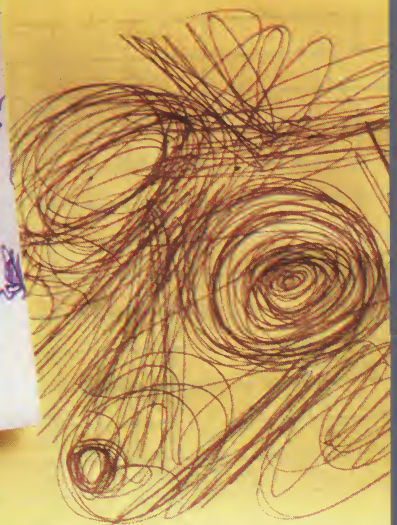
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CIRCLE NO. 207 ON READER SERVICE CARD.

battery-powered Diconix 150 ink jet printer from Diconix, Inc., of Dayton, Ohio, measures just 11 by 7 by 2 inches, weighs 3.8 pounds, and prints at 50 cps in a half-hearted stab at letter-quality printing, or 150 cps in draft mode. Best results come on clay-coated paper, which feels like a seldom-washed school blackboard.

Color on the Big Screen

In a year or two, you'll see portables with color LCD displays. Today, nearly every portable has the ability to drive an external color display. As with the printer, you should be able to borrow a monitor at your destination. Just be sure to bring along a monitor cable. (You want a DB-9 color monitor cable, male at one

**You can call ahead
and ask about
modular phone jacks,
but if you do you'll
likely be greeted
by a "Whuzzat? Lemme
transfer you to someone
who might help."**

end, female at the other.) One caveat: most portables produce only grainy 1981-vintage CGA color output, 320 pixels across, 200 down, in four colors. Unfortunately, by the time portable makers reach EGA (640-by-350-pixel resolution, 16 colors), the market will have moved on. Desktop PCs are already headed toward VGA (640-by-480 resolution, 16 colors), with 1,024-by-768-pixel resolution, in 256 colors, on the horizon.

You can hook your laptop to either a digital monitor (TTL) or a multiscanning monitor such as the NEC MultiSync (set it to TTL, not analog). If you're planning to do demos repeatedly, look for a lunch-box-style portable with expansion-slot capabilities that can accept an EGA or VGA video card (Compaq, Dolch, Sharp, Zenith, Toshiba, or Mitsubishi, but not all models).

It's also possible to display images on a color television. To do that, you'll need an RF modulator (Radio Shack Part No. 15-1273, \$26.95) to connect your portable and the TV. The TV image quality is even worse than CGA, if that's possible.

Transferring Files

A half-dozen laptop-to-desktop file transfer programs allow you to shift information between machines with 3½- and 5¼-inch floppy drives. The machines communicate via the serial ports and trick them into running at 115,200 bps, roughly the speed of a floppy disk, 12 times faster than normal for a se-

rial port. Best of the breed are Lap-Link (\$129.95) from Traveling Software, The Brooklyn Bridge (\$139.95) from White Crane Systems of Norcross, Georgia, and Fastwire II (\$129.95) from Rupp Brothers of New York City, all with cables and connectors to fit any combination of portable and desktop PCs. In fact, almost any product you buy will work fine. Traveling Software also makes Lap-Link Mac, \$139.95, which allows you to make PC-to-Mac transfers.

If you're planning to add a 3½-inch drive to your desktop PC, spend an extra \$50 to \$100 and get a 1.44MB drive (portables with these are beginning to pop up). These drives read and write 720K floppy disks accurately.

Miscellany

Airlines are getting tougher about the two-bag carry-on limit. If you carry a garment bag and a briefcase, your portable case puts you over the top. Solution: a soft-sided bag that holds your portable, your portable's accessories, and your briefcase's paperwork. Try luggage shops, mail order suppliers, or just about anywhere but a computer dealer (machine-specific cases never have enough extra room). You can pay anywhere from \$25 for a black nylon bag to \$800 for a glove-leather personal statement.

Bring an extra battery if you'll be away from a 110-volt power supply for an extended period. They're \$50 to \$100. If you travel by car, you can power your portable from the cigarette lighter. Most makers have 12-volt converters that cost between \$30 and \$50; some provide a trickle recharge. You can even shop for hulking temporary battery supplies to power AC-only portables. These weigh from 7 to 13 pounds and cost \$400 to \$500 for an hour's power. If your batteries are nickel cadmium, try to run them all the way down before recharging. Nickel cadmium batteries develop memory; if you only discharge them halfway, they'll begin to give out halfway through their normal charge times.

If you travel by train, look for the 110-volt outlets placed under some seats. These outlets work best if you use a combination 110-volt adapter/battery charger, because trains suffer ferocious power surges and brief outages that bring AC-only portables to their knees. Diesel trains are safer than electrics in this respect.

The software you'll use on the road isn't any different from what you'd use in the office. Portables are robust enough to run just about any program. If you want to travel with just a handful of disks, consider all-in-one integrated programs such as WordPerfect Executive, OfficeWriter Express, Microsoft Works, and PFS:First Choice. Also, although Borland International's new SideKick Plus wasn't intended to serve this purpose, it has enough power to be your only software on the road. You'll need a com-

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munications module, a notepad or word processor, and possibly a spreadsheet; a calendar and calculator can't hurt. And don't forget your DOS disk.

Also consider General Information's Hot Line II, a superior telephone list and dialer. Hot Line II finds the area code of any major or minor city, tells you what time it is at the place you're calling, automatically strips local area codes if you're calling locally, and contains a list of 10,000 frequently called business numbers (including that of the Naval Observatory's atomic clock, 900-410-8643, in case you don't trust the clock in your hotel). Hot Line II also has a utility for printing your personal phone directory before you hit the road.

When planning a trip, be realistic about weighing yourself down with survivalist accessories. All those

extras add up. The most invidious culprits are AC-to-DC transformers. Most battery-powered accessories need AC backup and recharging if you plan to operate them for more than an hour or two. Your portable modem may only weigh 10 ounces, but the transformer could add another pound. If you want to pare down your gear, you can borrow a modem outlet or even a complete PC when you visit the branch office, instead of logging on from the hotel.

If you carry all your survival equipment with you, be careful on trips to the coast: you'll sink like a rock if you fall into the water with your portable's carrying case. Of course, if your portable is waterproof, you might luck into a trans-Pacific phone cable. Now, if you just whip out the Swiss Army knife and those alligator clips ...

Laptop CONTRABAND

"Ah, señor, your computer is very small.

I'm afraid you will have to come with us."

By TIM CAHILL



I WAS THINKING about computers as status symbols, and the guy on the other side of the wooden table apparently thought I was James Bond.

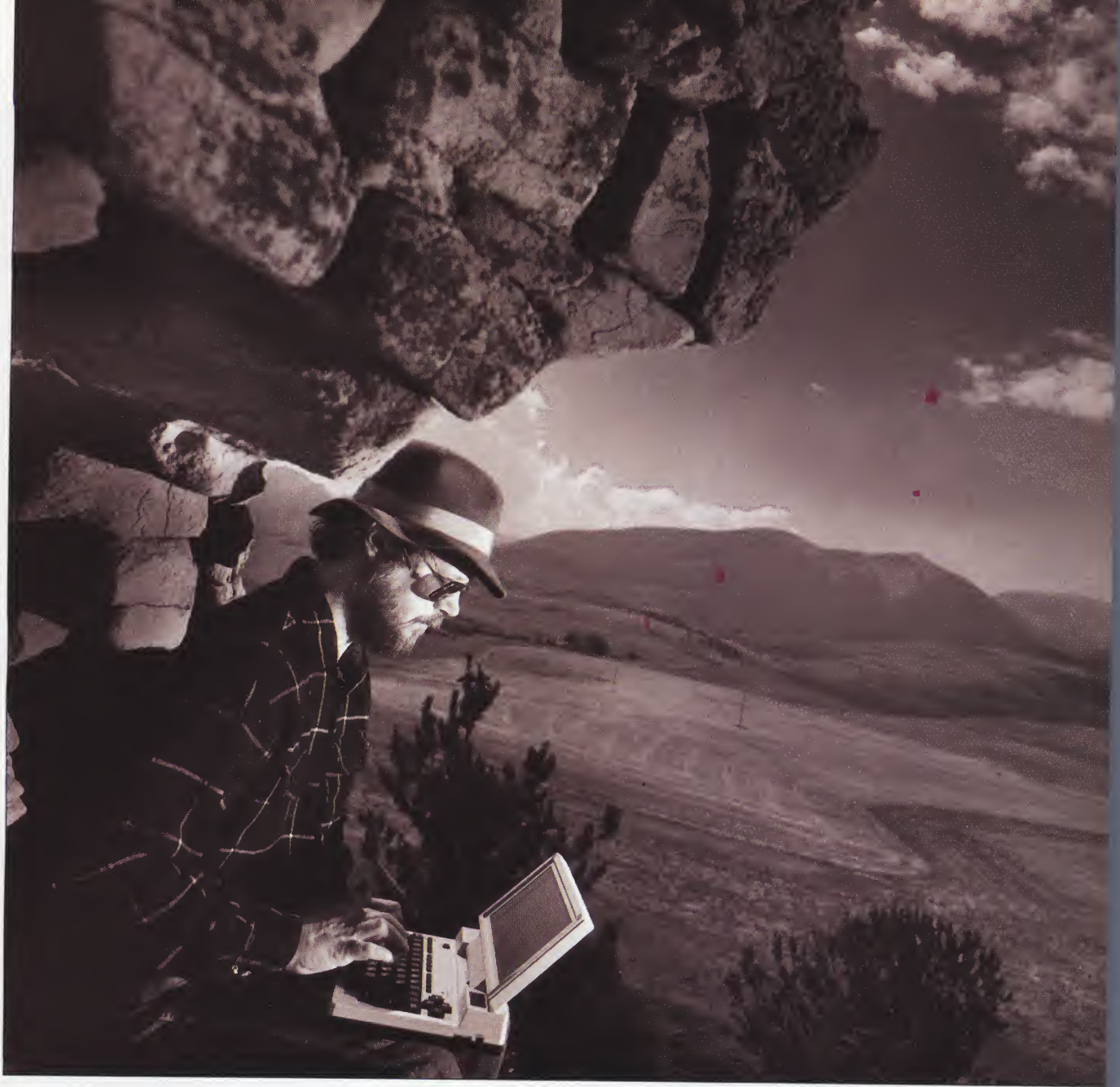
It was stifling in the airport. Politics aside, Honduras, in July, can be oppressive. Customs officials were checking luggage by hand, pawing through people's underwear and toothbrushes in painfully slow motion while the plane that would take us out of the country was waiting, overdue for takeoff. There was a grumpy conga line of sweating, irritated people snaking back 100 yards or

more behind me. The customs man opened my shoulder bag and examined its contents with what I took to be growing excitement.

I like to travel light, and my rather ordinary complement of traveling journalist's gear may have seemed excessively electronic. I had a palm-sized autofocus camera, a smaller tape recorder, and a 4½-pound notebook-sized computer. Every single one of the devices took double-A batteries. I had a dozen spares in a small cloth pouch.

My passport and visa said that I had come to Honduras as a tourist. You always say you're a tourist, even if you've come to write an article or research a book. It's just easier that way. Every journalist does it. I was researching a book.

STAMP PHOTOGRAPHS BY STEVEN GREENBERG



"You have visited Tegucigalpa for the purposes of tourism?" the official asked.

"For a certainty," I said in my bad Spanish. I had a vision of the entrance to the casino at the Maya Hotel. There was a large sign featuring a black silhouette of a handgun circled in red. A thick red line slashed across the circle. "We're sick and tired of people getting shot in the casino" was the message. A couple of men who did carry guns stood on either side of the sign, presumably to enforce the prohibition. This is the sort of gay, madcap sight tourists can expect in Honduras these days.

Given the general state of tension in the country, precious few Americans pop down to Honduras for a romantic holiday in the sun. Americans—and other

nationals—come for less salubrious reasons. Sometimes their purposes lie on the shadowy side of morality and require mysterious electronic devices.

Was it unusual for a tourist to possess the kind of gear that was now spread out across the scarred wooden customs table? Tourists take photographs, certainly, but how many of them need little tiny tape recorders, little tiny computers? The customs official stepped back from the table and spoke to another man, who appeared to be his superior. I heard the word *problema* and something that sounded like *espina*. A thorny problem.

But wait! No! Maybe the word was *espía*. Spy. Did they think I was a spy? Me? Did this worthy and alert official think that I had come to spy on Honduras

PHOTOGRAPH BY REX NYSTEDT

equipped with a Tandy Model 200 notebook-sized computer, a machine that cost me all of \$499 and gallops along at 2.4MHz? Whom was I spying for? Ethiopia? Rhode Island?

It occurred to me that, in these situations, mere miniaturization counts against you.

"Ah, señor"—I imagined this conversation—"your computer is very small. I'm afraid you will have to come with us."

They'd be dragging me away and I'd be appealing to the people in line. "It's small, I admit that, but, damn, it's slow. It's only got 60K of usable memory, for the love of God. You've got to believe me."



AND THEN—WORSE—I recalled meeting the journalist Nicholas Daniloff some months earlier. This was shortly after his protracted ordeal in a foreign prison. Daniloff, a reporter

for *U.S. News & World Report*, had been covering the Soviet Union for that magazine and was arrested as a spy shortly after U.S. officials arrested a Soviet citizen for spying. The timing was, to understate the case, suspect. Daniloff's detention was a very unsubtle move in an international chess game. What the Russians were saying was "Hey, why don't we exchange your innocent guy for our guilty one?" And that's the way it worked.

Daniloff and I had chatted about computers. And what he carried on foreign assignments was the same Tandy Model 200 that seemed to fascinate the Honduran customs man. The computer, Daniloff and I had agreed, was certainly less than perfect. Aside from being suspiciously small, the thing was slow, it wasn't compatible with the industry standard, its memory was limited...

But the Model 200 will run 16 hours on four small batteries. Sixteen hours. It is a swell computer for foreign correspondents and others whose work takes them to areas where electricity is unreliable or nonexistent. Its LCD display, granted, is minuscule: 40 characters by 16 lines. Still, Daniloff and I agreed that it was just large enough to edit longer, more complex magazine articles. The letters in the small display are legible, even under those overhead lights in airplanes. And the dinner tray on an airplane coach seat will support the Model 200. (I have an MS-DOS portable that weighs 15 pounds and have

Tim Cahill, the author of Buried Dreams and Jaguars Ripped My Flesh (Bantam Books), lives in Montana. A collection of his adventure/travel articles, A Wolverine Is Eating My Leg, will be published by Random House in December.

discovered that airplane trays collapse under its weight.) Something else of value to the hard-traveling foreign correspondent or spy: the Model 200 zips through airport X-ray machines without damage.

Edward R. Murrow would surely have had a Model 200, had it been available, in London during the blitz; Walter Cronkite, as a young war correspondent, might have carried one onto the field of battle. Just so.

The Model 200 also stands up to abuse. The one I use has endured extremes of temperature the manual insists should have killed it. One evening, in a Venezuelan jungle village not far from the borders of Brazil and Guyana, I found myself in a roach-ridden room above a bar, sitting in my shorts, sweating, and working on a story about the nearby diamond mines. The Model 200's LCD display was illuminated by a pair of candles. The electricity in Santa Elena operated until 10 P.M. It was midnight. There was a mosquito coil burning on the table where I sat and a bottle of rum beside it. I could hear the sound of people laughing and shouting in the candle-lit bar below.



I HAD INSISTED to Daniloff that there was a kind of sweaty, boys'-book glamour to the Model 200. And now, in Honduras, it occurred to me that the

machine was also the computer of choice for persons falsely accused of spying.

"You must come with me," the official said.

I followed wordlessly, and the man led me to a small room where several wooden chairs were spaced around another beat-up wooden table. An interrogation room. The man opened my cloth bag and carefully arranged the dozen batteries between us.

"You have," he said, "very many batteries."

I nodded.

"Your plane," he said, "will be leaving soon."

I was thinking about Nick Daniloff and didn't quite get it.

"I believe you want to be on that plane, yes?"

"Yes," I said. I was thinking, *I am going to jail for carrying the slowest computer money can buy.*

The man said, "Batteries are expensive and difficult to obtain in Honduras."

"I know," I said. "That's why I..."

The man stared at me. Dawn broke, the sun came up like thunder, and I glanced down at the batteries.

"Could I keep four of them?" I asked. "For the computer?"

"You have a computer?" the man asked in genuine surprise.

I pushed the batteries over to his side of the table. "Actually," I said, "I'd like you to have them all." ■



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the art of barbara nessim

By CAROL OLSEN DAY

Sunlight surges into Barbara Nessim's studio on the fifth floor of an old cast-iron building on Greene Street in New York's SoHo. The rumble of trucks on the narrow cobblestone street outside vibrates against the commercial building. But inside, Nessim's work, leaning against and hanging on a new freestanding white wall, is a statement of calm, timeless beauty.

Shadowless violet figures, white outlines of ancient hands on a burnt-orange torso, a turquoise goddess: the images of Nessim's art evoke many times and many places in one time and one place. Her style and her subjects convey the feeling of things both ancient and brand new, of the past and the future. And all her work expresses movement, grace, and unity.

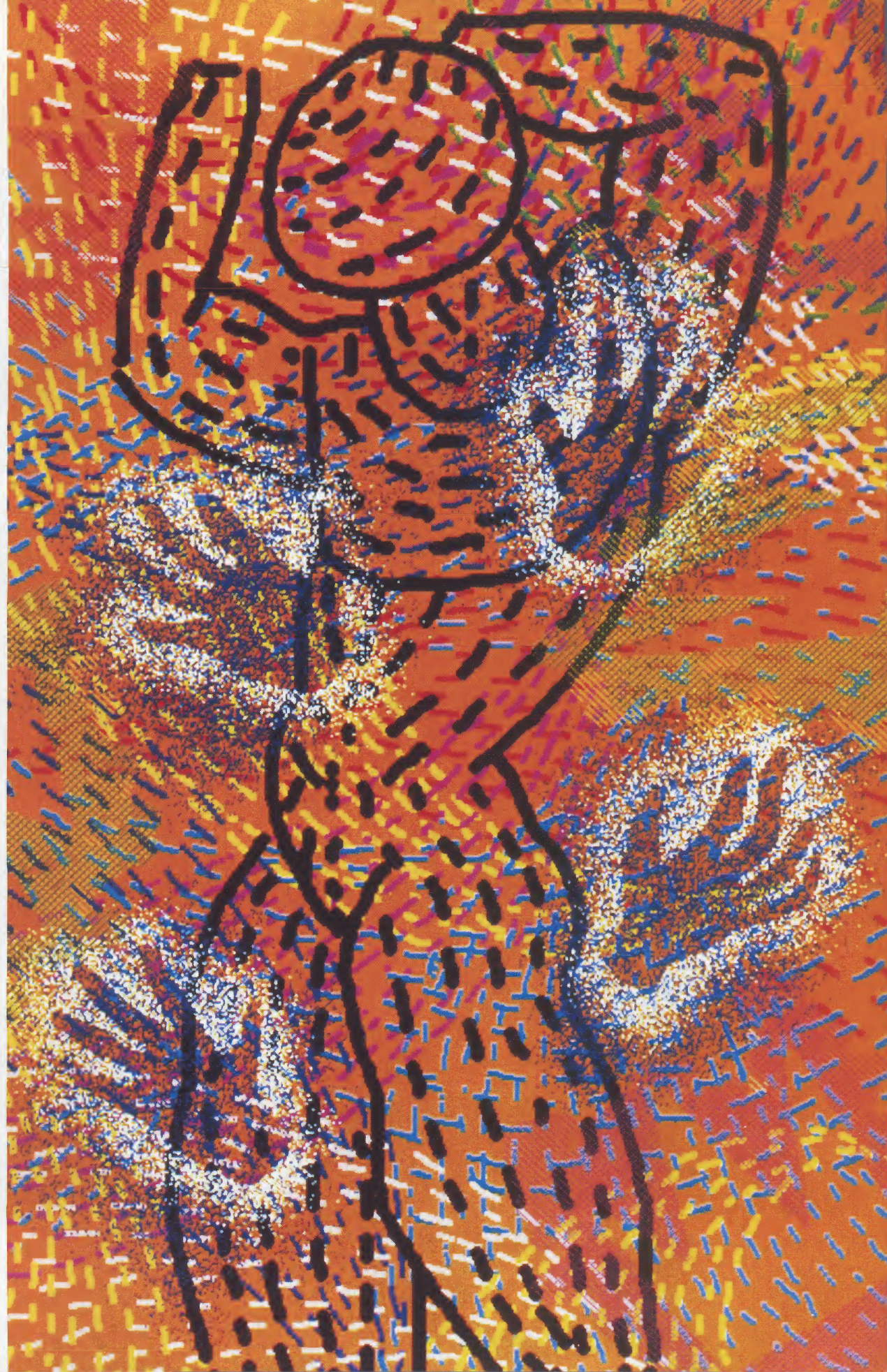
Nessim's art materials also combine the ancient and the modern. For in addition to the artist's traditional media of pen and ink, oils, gouache, and pastels, she uses computers to capture her art on paper and on film. An Apple Macintosh



Barbara Nessim in her SoHo studio. In addition to working in her studio, Nessim lectures at conferences such as NCGA and SIGGRAPH and teaches at New York's School of Visual Arts and Fashion Institute of Technology.

Opposite: While in Japan, Nessim created *Hand Memory* on the NEC PC 100. Part of her inspiration came from a Japanese TV program that showed a photograph of a cave with primitive hand drawings on the walls. The work was digitally transferred and printed on a JetGraphy 3000.

PHOTOGRAPH BY ELIZABETH NAPLES



To create these works, Nessim used an NEC PC 100 with Basic Graphics software and produced output using a JetGraphy 3000. The results look more like the drawings in her sketchbooks than do the works she created using the Norpak IPS 2. The PC lets her draw lines and curves; the IPS 2 limited her to six basic forms. Whichever system she's using, Nessim tries to find something unique in it that serves her style.





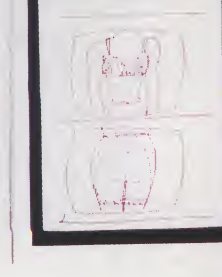
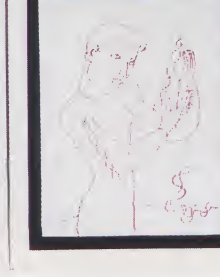
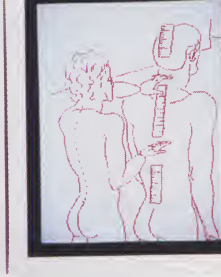
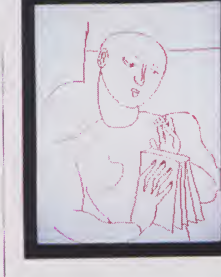
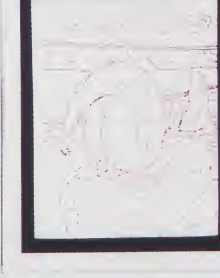
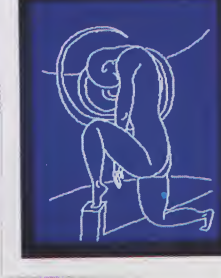
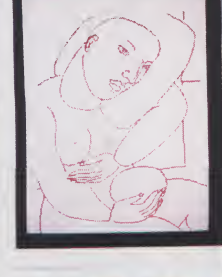
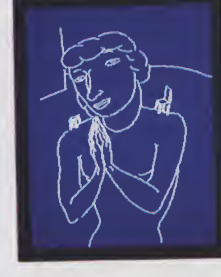
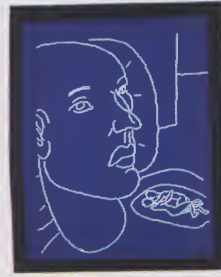
Plus and an Imagewriter 1 dot matrix printer, and a Commodore Amiga and a Polaroid Palette film recorder, have places of their own in her studio.

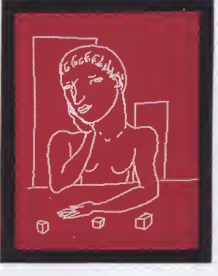
Switching hardware and juggling software are no problem for Nessim, whose work has been shown at the Louvre, Sweden's Museum of Modern Art, and the Ginza Gallery in Tokyo, and has appeared on the cover of *Time* and in *Newsweek*, *Esquire*, and *Ms*.

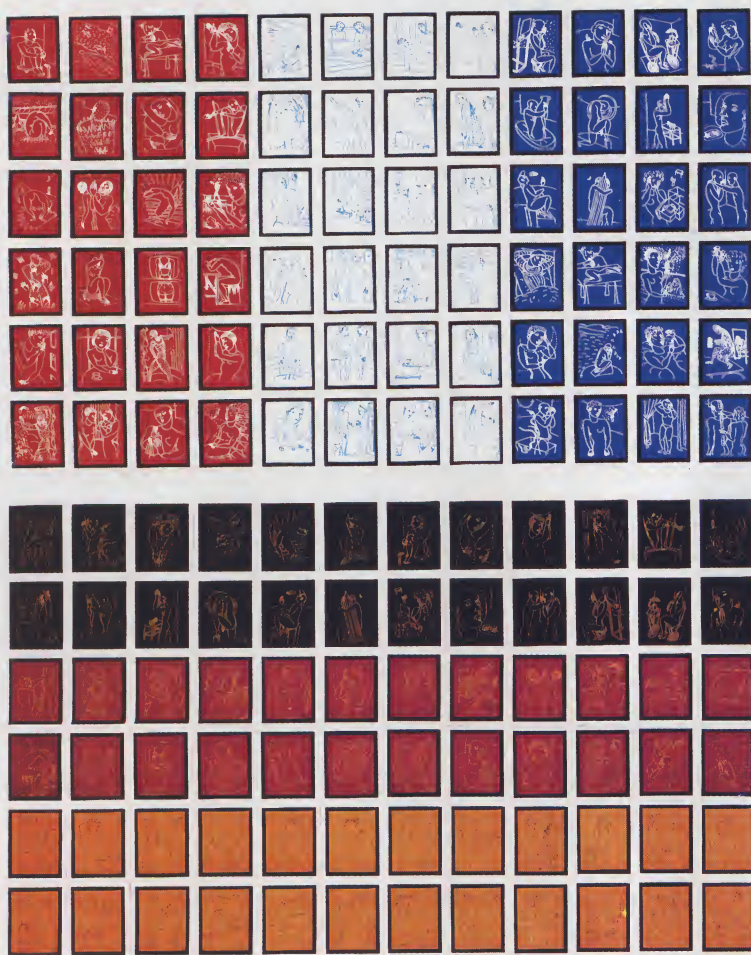
Nessim started using computers in 1982, when art director Joel Azzerad invited her to work at Time Video Information Services on the Norpak IPS 2. Her first works were limited by the IPS 2's six drawing modes (dots, lines, circles, rectangles, polygons, and arcs) and six colors (red, blue, yellow, green, magenta,



Carol Olsen Day is a senior editor of PC/Computing.







Nessim is currently working on a series of flags of the world, using the same 72 drawings she created on the Commodore Amiga with Deluxe Paint software. She arranges the drawings in different positions and adds different color backgrounds for each flag. The finished flags reflect the essential sameness of people throughout the world, despite the diversity of their politics. So far Nessim has completed the U.S., French, and German flags.

Without the computer, Nessim would never have been able to undertake the flag series: making the changes required for each one would be too time consuming and tedious in traditional media. Not only is the computer the necessary medium, it is part of the message too: Nessim feels that computers are making the globe smaller.

and cyan), plus black and white and six shades of gray. Since then she's used a number of personal computers, including the NEC PC 100, the Mac, and the Amiga. PCs give her more flexibility for drawing the curved lines she uses so freely in her sketches.

The artist says that the best thing about using a computer is that it lets you change something quickly and easily—without having to redraw an image from scratch—while still keeping the original intact. “The way the computer lets you easily and quickly edit words, it also lets you edit drawings,” she says.

“The luminosity of color, the easily mixed palette to develop the choice of colors, and the variety of tools, all in one place—it's great.”

The inspiration for Nessim's computer work comes from the drawings in her sketchbooks. She's filled an average of four sketchbooks a year since 1960, when she graduated from the Pratt Institute.

Getting the artistic work into the computer is easy for an experienced artist like Nessim. What's more difficult is getting the work out, since producing high-quality, large-scale hard copy can be expensive. Pinned to a wall in Nessim's studio is an advertisement for her dream machine: the Fujix JetGraphy 3000 color ink-jet printer, which costs about \$175,000 and can print large, professional-quality color prints. Nessim has used a JetGraphy 3000 in Los Angeles to print some of her work, and she's hoping to have access to one in New York someday soon.

For Nessim, the computer is part of her paint box, not an exclusive tool. It's another way—a modern, electronic way—to draw and paint the images she creates with pen and ink in her sketchbooks. “If all I had were a stick to draw with and sand to draw in, I'd draw the same way I do,” she says. Lucky for us, she has the computer. ■



Above: The resolution, available forms, and colors of the Norpak IPS 2, the first computer Nessim used extensively, are limited. But the artist turned the limitations to her advantage. She became so adept at using the arc shapes of the IPS 2 that the writers at Time Video Information Services dubbed her the "arc angel."

Left: Nessim prints the drawings she creates on the Macintosh Plus on pH-neutral rag paper and then uses pastels to color them.

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Group Dynamics

When the going gets tough, the tough go to meetings. Inside four PC user groups.

The bad thing about personal computers is that they can be so... well, so personal. Sometimes it seems like it's just you and the machine, and what started out as a passionate embrace of new technology has turned into a half nelson—with you on the losing end.

This situation calls for a user group.

For users at all levels, such groups can mean never having to be alone again. There is, after all, strength in numbers. There is also advice, answers, counsel, and comfort.

And it's not just beginning users, the people who don't know which side of a disk is up, who can benefit. Tom Enrico, president of the Capital PC User Group, joined the organization, he says, because "I've worked in a lot of smaller offices where I was the person who knew the most about PCs. I was looking for a place where I could meet people who knew more than I did."

Just as there are different reasons for using a computer, so there are different kinds of user groups, ranging from intimate gatherings in someone's living



room to massive meetings with all the hoopla and bluster of a traveling road show. Some assemblages focus on particular computers or software. Others concern themselves with management issues, while still more are general-interest gatherings concerned with education and support.

What's it like to be on the inside of one of these clans? Are they filled with socially inept wireheads whose idea of a good time is taking the cases off their computers, scrambling the wires, and putting it all back together blindfolded? Or with buttoned-down types whose entire vocabulary seems to be made up of buzzwords they've recently discovered in *The One-Minute Manager*?

The answer is a loud and clear no. The groups are made up of people like you and me who are passionate about their computers and are looking for like-minded others.

To give some idea of the variety of the groups' cultures, we've visited four of the better-known ones. The Houston Area League of PC Users serves a general membership with an entrepreneurial spirit that turns the group's sprawling meetings into a flea market for hardware and software, with HAL's own group-buying operation and software library leading the way. LAPALS, the Southern California Paradox

Users Group in the Los Angeles area, is focused solely on the use of the Paradox database. The Capital PC User Group, like many other general-membership groups, concentrates on education and user support and provides a roost for a flock of more narrowly focused special interest groups. The Chicago Association for Microcomputer Professionals, on the other hand, brings together people to discuss management issues surrounding PCs in business.

As varied as these four groups are, they, and many more such gatherings across the country, still have one essential in common: they bring together people with similar needs and interests.

So says Jerry Schneider, executive director of the Association of Personal Computer User Groups (APCUG), a national "information network" of 57 user groups, and a founding member and past president of the Capital PC User Group. He notes, "User groups provide one-on-one instruction and assistance, publications, bulletin board systems, help line services that put new users in touch with experts, special interest groups to bring together people who use the same software or hardware, and monthly meetings where users can talk with the leaders of the industry."

They offer all these services at modest fees—from \$15 to \$40 per year—because they depend on the efforts of an active volunteer base.

"By participating in activities with people who have already been there, users can avoid many of the pitfalls and pratfalls in computer learning," Schneider says. "Users helping users is what user groups are about."

—David DeJean

ILLUSTRATIONS BY JAMES NOEL SMITH



HOUSTON

The Houston Area League

There's a giant white elephant in the parking lot. John Robert Behrman, who is wearing a pith helmet, glances at the elephant and shrugs. As a vice president of the 8,000-member Houston Area League of PC Users (HAL-PC), the largest DOS-specific user group in the known universe, Behrman has seen stranger things. The group holds its monthly general meetings in the Arabia Shrine Temple, down the road from the Astrodome, and the

By **PETER H. LEWIS**

Shriners probably park the elephant here between circuses, he suggests. Between Shrine circuses, that is—it would be wrong to characterize the general meetings of HAL-PC as circuses, even though odd things occasionally happen when several thousand DOS users get together.

Like the time Philippe Kahn of Borland International burst into the monthly meeting leading the entire Rice University Marching Band, tossing copies of Turbo C left and right into the cheering crowd while strutting to "Louie, Louie."

Not that people do that sort of thing regularly here. Most of the time this is a serious user group. True, there are some suspected Martians among the 2,000 or 3,000 members who show up for the general meeting each month, but generally this is a sober and responsible bunch. There are guys in gimme caps and cowboy boots who, by day,

design guidance systems for cruise missiles and simulation programs for NASA; accountants so straight that they probably wear neckties and wingtips to bed; little old white-haired ladies who note that they are pissed off about bugs in their genealogy programs; good ol' boys who work in the "awl bidness," agriculture, or shipping and international trade, the foundations of Houston's wobbling economy.

Dues are a democratic \$25 a year; the monthly journal that is sent to members weighs in at 96 pages. The youngest member signed up at six weeks of age; the oldest is 83.

Most of all, though, HAL-PC is a

**There have been no pistol-whippings,
which means HAL-PC operates on a slightly
higher plane than the Texas legislature.**

gathering of middle-aged, middle-class Texans who think the PC is important enough to warrant venturing out on steamy Houston nights to find out what other people are doing with their machines. "There's a ferocious amount of talk," one woman says. A man wearing an 8086 tie tack adds, "It's serious, it's a passion." The passion reaches religious fervor on some issues. For instance, there are no Macintosh users here (at least, none who will admit to it), and booing follows a mention of the "A" word.

The meeting officially starts at 7 P.M., although the crowd is already assembling at 4:30. Wives of the Shriners are getting ready to hawk popcorn, chili dogs, lemonade, and iced tea, and more than a dozen local computer vendors are setting up booths. "The logistics are a lot like putting on a rock concert," Behrman says. The Arabia Shrine Temple ballroom accommodates only about 2,500, so the meetings are videotaped by a professional crew and broadcast over Houston Cable TV for those who don't like the hassle of crowds and the limited parking. Volunteers with walkie-talkies patrol the main and satellite parking lots as shuttle buses go back and forth. The Parking Special Interest Group is one of the most powerful SIGs in the organization.

Actually, "organization" is not the right word. From its earliest days, in which a few people got together at a blood bank, HAL-PC has shunned organization. The bylaws were written in 1982, when the group had fewer than 100 members; there were 8,079 at last count. Still, no one can agree on how to rewrite the rules. The board of directors has 65 members, which makes for lively discussions. There have been no canings or pistol-whippings so far, which indicates that HAL-PC oper-



ates on a slightly more civilized plane than the Texas legislature, but shouting matches are common. "One time the president decided to use the agenda to shut someone up, but the board overruled him," a board member confides. "He broke the door as he left."

HAL-PC's sheer size probably arises from that very lack of organization. "Somehow or another, HAL-PC has not been so deliberate that one group has run off another," Behrman says. Despite the diversity, or perhaps because of it, there is an overall unity to the group.

The lack of organization is offset by a heightened sense of ritual, particularly at such events as Hawaiian Shirt Night, which is called whenever Kahn is in town. "It's the only way you can be this big without organization," Behrman says.

Another ritual is the sale of floppy disks. HAL-PC may be the largest consumer of floppy disks in the country, buying from 30,000 to 120,000 disks a month and reselling them to members at cost. The line to buy floppies starts early and snakes through the halls. Members only, no preorders, no mail orders, no telephone orders, first come, first served, no credit cards. One member has driven in from neighboring Louisiana to buy diskettes at the meeting; John Naman, a volunteer who has been trying for some time to resign his position as group purchasing director, says some members buy hundreds of diskettes at HAL-PC prices, resell them to their employers at twice the cost, and still save their companies money. Diskettes that sell for \$50 a box on the street (\$98 list) are selling here tonight for \$10. Again, the brute size and buying power of the group, along with its insistence on quality, force suppliers to pay attention and to give Naman their best prices.

Yet another opening ritual is Q&A, conducted by Malcolm McCorquodale, who presides over the session and answers most of the

Peter H. Lewis is a columnist for the New York Times.

questions. If he gets stumped, the question goes to the crowd. Usually someone in the vast hall has the answer, and the seeker and the solution meet under an American flag.

A young man who worries about Lisp compilers sits next to a man who can't figure out why his hard disk won't work; it turns out that the hard disk is really a 3½-inch drive, and he has 5¼-inch floppies.

In a corner, several members who control computer-related purchasing for some of the biggest corporations in the United States chat quietly about the relative merits of spreadsheets. The outcome of the discussion could sway a million-dollar buying decision. Discussions begun at a HAL-PC meeting often wind up as purchase orders six or seven digits long.

Computer companies recognize the clout of HAL-PC's members and regularly come calling. Tonight, representatives from Microsoft, Borland, Ashton-Tate, WordPerfect, and MicroPro have agreed to a live shoot-out to see who has the best word processor. Each has about ten minutes to make a case. Long-winded presentations are interrupted by a loud gong; the gong is greeted with hoots and cheers. ("We had to use the gong because otherwise the folks start chanting 'ten, nine, eight,' et cetera," an official explains.) Still, the crowd is attentive and polite. Borland's new Sprint software gets a lot of interest, but a clear winner is hard to discern.

The hour grows late and door prizes are awarded. Jerry Schneider, executive director of the Association of Personal Computer User Groups, makes a guest appearance to hand out "Spencer Katt" T-shirts. Then, with the familiar lack of organization, the group simply starts to evaporate. Soon the Shrine Temple ballroom is practically empty, and a few stragglers head off past the white elephant to a local eatery, where they shovel down some chicken-fried steak and black-eyed peas. It's a ritual, and it will be repeated the first Tuesday of every month.

Where the Groups Are

User groups come in all shapes, sizes, and varieties. Most are independent membership organizations devoted to particular products or types of computers. The following list, compiled by the Association of Personal Computer User Groups, identifies some of the larger and more important user groups.

Phoenix PC Users Group

P.O. Box 35637
Phoenix, Ariz. 85069
(602) 954-7519
Membership: 580
Interests: IBM PC and compatibles.

Berkeley Macintosh Users Group (BMUG)

1442A Walnut St., #62
Berkeley, Calif. 94709
(415) 849-9114
Membership: 3,500
Interests: Apple Macintosh.

LAPALS—The Southern California Paradox Users Group

901A N. Pacific Coast Hwy., #200
Redondo Beach, Calif. 90277
(213) 374-0151
Membership: 4,500
Interests: Paradox PC database system.

Los Angeles Macintosh Group (LAMG)

12021 Wilshire Blvd., #349
Los Angeles, Calif. 90025
(213) 278-5264
Membership: 1,000
Interests: Apple Macintosh.



North Orange County Computer Club

P.O. Box 3616
Orange, Calif. 92665
(714) 998-8080
Membership: 1,200
Interests: All computers.

Orange Coast IBM PC User Group

P.O. Box 6100-211
Costa Mesa, Calif. 92628
(714) 898-7998
Membership: 1,000
Interests: IBM PC and compatibles.

Pasadena PC User Group

711 E. Walnut St.
Pasadena, Calif. 91101
(818) 795-2300
Membership: 900
Interests: IBM PC and compatibles.

Sacramento PC Users Group

P.O. Box 685
Citrus Heights, Calif. 95611-0685
(916) 332-1944
Membership: 2,400
Interests: IBM PC and compatibles.

LAPALS

Not long ago, Greg Martin, a production control supervisor for the Nouvas Company in Orange, California, ran into a snag with a bill-of-materials tracking system he was creating with Paradox, a relational database package from Borland International. He couldn't get the program to perform some needed calculations.

Although he was a novice user without the support of an in-house information center, Martin didn't despair. Instead, he took the problem to a meeting of LAPALS, the Southern California Paradox Users Group, and before the meeting started, he buttonholed one of the group's experts. The result of the quick consultation was a short Paradox script that elegantly solved his problem.

Martin was beaming. "These guys have done everything with the program. Someone asks a question and they raise their hands with an answer. Everybody is just dying to help somebody," he says.

His is not an isolated experience. PCs may have become big business, but the fervor and spirit of the early days of personal computing are still alive and well at LAPALS. Each month, members of each of the group's four chapters meet to swap Paradox tips, tackle database problems, and hear speakers discuss topics like "Things You Never Knew About Paradox Queries."

Club members radiate an almost incandescent enthusiasm for their chosen database program and their club activities. John Calderas, editor of the club newsletter, *Instant Scripts*, feels that Paradox is the most exciting software package to

come along since VisiCalc. "When Paradox appeared, all of a sudden that enthusiasm and that interest sparked again. It just compelled me to the next level of computing," he explains.

LAPALS president Brian Smith says that similar feelings motivated his decision to start the group two years ago. "Paradox is a fun product because it's so interactive. You can try 15 different operations in about a minute to mix up the data in different ways. It's the sort of product that stimulates questions, and people want to meet other Paradox people and say, 'Hey, I've been trying to do this. How do you do the same problem?'"

According to Smith, about 40 percent of the club's 400 members are computer professionals, while the remaining 60 percent are non-technical people of all skill levels.

For the computer professionals, the club serves as a forum for the exchange of ideas and information. "Every time I go to a meeting I end up learning something," says Kevin Prichard, who serves as president of the Orange County chapter of LA-

pert users in the club are happy to share their expertise with the beginning and intermediate users. "The members feel free—and this is nice—to call some of us and ask questions from time to time. It helps them out and makes me feel like a hero," Colling says.

At a recent meeting of the Orange County chapter, 19 Paradox users gathered around a large teak conference table in the plush offices of Grubb & Ellis. The group was about evenly divided between conservative business types and those more casually garbed in knit shirts and tennis shoes.

Smith gave a demonstration, using a Compaq Portable II hooked up to an overhead projector, of several ways to update multiple data fields in a single operation. Then the meeting broke into smaller groups according to the members' skill levels.

The beginners clustered around a Toshiba laptop on a coffee table in the lobby and watched while an expert member demonstrated report-formatting techniques. In a separate conference room the intermediate

PCs may be big business now, but the fervor and spirit of the early days of personal computing are still alive and well at LAPALS.

PALS and works as manager of computer operations for the Pacific Southwest region of the Grubb & Ellis Company, a large national real estate brokerage.

A number of computer professionals see the club as an important means of promoting Paradox. Computer consultant Tim Colling, assistant editor of the club's newsletter, explains, "Paradox is a much nicer environment to develop custom database software in than anything else I've seen. And if it succeeds as a product, then I can continue using it in my business."

Therefore, Colling and other ex-

users discussed a member's problem with his database input form. Meanwhile, the advanced users met in the main conference room and offered suggestions to a member plagued by an infinite loop in his Paradox application.

These submeetings are a regular feature of LAPALS meetings and a major attraction for members. Pat Cline, who attended the intermediate-level session, explained that although she uses Paradox at work, her company's information systems department doesn't support the program. "So there I am by myself with no resources. Even the people



who are supposed to be educated in computers can't help. This kind of group gives me the support that I need."

Club leaders try to vary meeting agendas. Some are free-for-alls with no prepared topic, some feature instruction or a demonstration, and once in a while a speaker from Borland International, the publisher of Paradox, addresses the group.

Other club activities include a

Dara Pearlman is a freelance writer and computer programmer based in Cupertino, California.

monthly newsletter that contains Paradox tips, reviews of add-on products, and a library of public domain Paradox programs.

The name LAPALS is a deliberate pun, combining "LA" for Los Angeles and "PAL" for Paradox Application Language. And the "pals" designation is not a spurious one. Tim Colling believes the spirit of camaraderie and fellowship within the group plays an important role: "It's the same feeling you get if you're camping with a bunch of people, or diving or whatever you do. It's just fun."

San Diego Computer Society

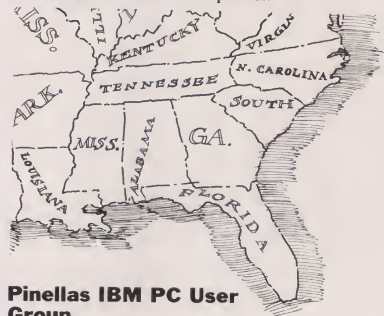
P.O. Box 81444
San Diego, Calif. 92138
(619) 284-7802
Membership: 1,200
Interests: All computers.

San Francisco PC Users Group

3145 Geary Blvd., Suite 155
San Francisco, Calif. 94118
(415) 221-9166
Membership: 900
Interests: IBM PC and compatibles.

Silicon Valley Computer Society

2464 El Camino Real, #190
Santa Clara, Calif. 95051
(408) 286-2629
Membership: 1,000
Interests: IBM PC and compatibles.



Pinellas IBM PC User Group

1331 Seagull Dr. South
St. Petersburg, Fla. 33707
(813) 347-5444
Membership: 1,300
Interests: IBM PC and compatibles.

Atlanta PC Users Group

P.O. Box 28788
Atlanta, Ga. 30358
(404) 368-1262
Membership: 700
Interests: All computers.

Chicago Computer Society

P.O. Box 8681
Chicago, Ill. 60680-8681
(312) 794-7737
Membership: 2,000
Interests: All computers.

The Rest of Us

P.O. Box 3500
Chicago, Ill. 60654
(312) 871-5086
Membership: 700
Interests: Apple Macintosh.

Kentucky-Indiana PC User Group

P.O. Box 3564
Louisville, Ky. 40201
(502) 897-6668
Membership: 625
Interests: IBM PC and compatibles.

Capital PC User Group, Inc.

51 Monroe St. Plaza East 2
Rockville, Md. 20850
(301) 762-6775
Membership: 5,800
Interests: IBM PC and compatibles.

Washington Apple Pi, Ltd.

8227 Woodmont Ave., Suite 201
Bethesda, Md. 20814
(301) 654-8080
Membership: 5,800
Interests: Apple and Macintosh.

Boston Computer Society

One Center Plaza
Boston, Mass. 02108
(617) 367-8080
Membership: 28,000
Interests: All computers.

Twin Cities PC User Group

P.O. Box 10360
Minneapolis, Minn. 55458-3360
(612) 888-0557
Membership: 950
Interests: IBM PC and compatibles.

The Capital PC User Group

In the lobby, a man in a raincoat was holding forth to a couple of listeners about installing a VGA adapter. This was obviously the right place.

On this particular evening at the Capital PC User Group, a crowd thinned somewhat by rain and summer absences had turned out 1,500 strong to ask questions of the expert help panel, hear a speech from WordPerfect president Pete Peterson, and attend special-interest-group sessions on everything from Lotus 1-2-3 to the AT&T 6300.

"Users Helping Users" is the slogan that appears under the group's logo of a PC topped by the Capitol dome. It was the dominant theme of the evening: questions and answers, problems and solutions, information and education. The Capital group is a general-membership organization, an umbrella that shelters people with differing interests and knowledge levels. For all their diversity, however, there is some common ground. To begin with, the members are heavily involved with PCs in their work, according to Tom Enrico, Capital PC's president. They also tend to be mature (median age falls into the 41-to-50 age group) and professional (median family income \$60,000).

The Capital group's meetings start at 7 P.M. in the Masur Auditorium in the Clinical Center of the National Institutes of Health in Bethesda, Maryland. But to get into the meeting room, attendees must run a gauntlet of tables set up in the corridor. The hucksterism that at times dominates other user group meetings is subdued here, partly because of restrictions on commercial

activity in federal facilities and partly because education, not entrepreneurship, drives this group's activities. As a result, the tables allotted to software library and buying-group sales were relatively quiet.

One table wasn't so easy to get past, though. Just inside the door, membership chairman Tom Rezek was selling memberships, and he was selling hard. Under his enthusiastic promotion, the constituency has grown from 4,200 in January 1987 to 5,800 by mid-1988. Rezek's goal is a solid 10,000.

Naresh Sayal handed Rezek a check to renew his membership. Why renew? "I like the magazine," he said. "I like the meetings, the good speakers, tips, things I can use at work and at home."

The group's magazine, *The Capital PC Monitor*, had its own table, as did the shareware library—two more facets of the education effort. The group's bulletin board wasn't represented, but it was frequently mentioned as the crowd moved into the auditorium.

At the buying-group table, Sandra and Jim Kobe were handling the bulk disk sales; they had their own reason for being there, largely personal. "We ran the buying group for a year, then got kind of burned out, you know, and pulled away. But we missed our friends, so we come back and help out."

Long-time members Ruta and Jim Godwin said they couldn't seem to stay away, either. "You get good information," said Ms. Godwin. "It's precise. You can ask just what you want to know." They have been members for a long time, but have become infrequent attendees at meetings. "We used to be more regular back in '82 and '83. It kind of wore off," she said.

Pete Peterson, the evening's featured speaker, was here to talk about WordPerfect's new version, 5.0. This revision of the company's best-selling word processor is not without its problems—as the attendees clearly let him know. What Peterson had to say—and what the audience had to say back—was an

object lesson in one of the most interesting functions of user groups: bridging the gap between vendors and the buyers who make up their marketplace.

"How many of you came just to see a demo of 5.0?" Peterson began. A good third of the people in the audience raised their hands. "And how many of you would specifically *not* want to see a demo of 5.0?" About an equal number of hands went up amid much laughter, and the evening was off and running.

Peterson spoke frankly and humorously about the problems with the new version and then invited questions. Hands went up all over the house, and for the next 45 minutes he fielded whatever the audience pitched at him—and some questioners were throwing straight at his head.



By DAVID DEJEAN

The meeting ended officially at 9 P.M., with no end to the questions for Peterson in sight. As a group grew around him in the front of the auditorium, the novice group gathered at the back of the hall and the special interest groups moved to the basement cafeteria.

"We are very heavily oriented toward helping each other," said Tom Enrico later. He cited the programs, the special interest groups, the bulletin board, and the publications, and to those examples he added a couple that were not so obvious to the casual visitor.

One such activity is the effort to focus the expertise of Capital PC members on projects that would improve nonprofit groups' use of PCs.

David DeJean is a senior editor of PC/Computing.

The Capital PC User Group has already given grants to establish two bulletin boards for community groups and is looking for more projects.

The other activity that has wide support among the membership, said Enrico, is creating policy statements on issues of concern to members and PC users in general. "Maybe it's just because we're in a city that's very sensitive to policy statements," he said. The group took a well-publicized stand against copy protection and more recently issued a statement on the controversy surrounding look-and-feel suits and copyright law.

As Peterson dealt with the last of his questioners and left with Enrico and other officers to find some dinner, users were still helping users all over the building.



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(314) 968-0992
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Interests: All computers.

New York Macintosh User Group

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(212) 969-0533
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Interests: Apple Macintosh.

New York PC User Group

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(212) 533-6972
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Columbus Computer Society

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Interests: IBM PC and compatibles.

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Interests: Apple Macintosh.

Portland PC Club

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Portland, Ore. 97205
(503) 226-4143
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Interests: All computers.

Philadelphia Area Computer Society

La Salle University
Philadelphia, Pa. 19141
(215) 951-1255
Membership: 1,700
Interests: All computers.

Palmetto Personal Computer Club

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(512) 231-8497
Membership: 550
Interests: IBM PC and compatibles.

CAMP

Many personal computer groups try to be all things to all people. Not so the Chicago Association for Microcomputer Professionals. CAMP is not open to hackers or hobbyists. Vendors, consultants, and headhunters need not apply. Instead, the group limits membership to decision makers who buy, install, and support microcomputers for their employers.

"We discuss things that probably wouldn't interest the end user," explains executive director Julian Horwich. While technical details are brought up, he says, "our focus is technology choice and policy issues."

This focus keeps membership small and meetings (which average about 50 attendees) easy to manage. It also provides an unusual forum. CAMP members are well known for their candid views about the latest personal computer technology. And PCs aren't all they talk about; CAMP gives time to Macs, minis, and mainframes as well.

Although CAMP meetings are small, they attract an impressive

hardware and software companies.

Most meetings concentrate either on problems facing corporate micro managers or on issues relevant to corporate software developers. They usually feature one or two speakers, followed by a roundtable discussion. CAMP also sponsors training seminars and vendor fairs, where hardware and software companies display their latest.

In question-and-answer sessions, CAMP members are tough. Speakers can't get away with superficial replies—this crew is ready for the technical minutiae.

Members of CAMP say they find the meetings useful not only as a source of technical information, but also for the chance to see how other micro managers solve problems. For some, the real benefit doesn't come until after the formal meeting, when members cluster in groups of three or four and share tips, horror stories, and computer gossip.

Betsy Gurlacz, a user support specialist with Commerce Clearing House in Chicago, says she attends CAMP meetings to "stay one step ahead of the users."

Gurlacz joined CAMP after finding that the Chicago Computer Society failed to meet her needs. "Too often it seemed like a bunch of penny-pinchers trying to find out where they could get the cheapest equipment," she says.

Other members take pride in the way CAMP works quietly with ven-

**In question-and-answer sessions,
CAMP members are tough.
Speakers can't get away with
superficial replies—this crew is ready
for the technical minutiae.**

roster of speakers. Representatives from Microsoft, Borland, and Compaq have spoken before the group, and a CAMP-sponsored vendor fair in May attracted more than 236

dors. The group rarely allows the press to attend meetings and carefully guards its membership lists. Horwich claims this makes vendors more receptive to CAMP input and more willing to work with the group to resolve a problem.

By DOUG VAN KIRK



Although CAMP literature highlights speakers, perhaps the most interesting part of a meeting's agenda is the roundtable discussion that follows a lecture. It's here that members get to speak their minds, ask for help, and tell tales of woe.

Roundtable participants have strong feelings about everything, including the latest computers from IBM and Compaq, as well as networking and DOS. At one recent CAMP meeting, several members said they were disappointed with IBM's PS/2 Model 50Z and Model 70 computers.

One member described an unusual remedy he'd discovered: a new computer he was testing had difficulty running a particular piece of software—until the machine was knocked off the edge of a desk and fell 3 feet to the floor. The comput-



er hasn't had any problems since.

And several members spoke about their experiences with networked databases. Their impressions? As a whole, the group is dissatisfied with dBase, and many said they are switching to Paradox to take advantage of better network support.

The session also touched on current reliability problems with hardware and software. Just about everybody had a story about poor support, a machine that simply refused to work, or a persistent incompatibility that a vendor was unable to fix.

When discussion turned to the new IBM SilverLake minicomputer, several people expressed dissat-

Doug van Kirk is an associate editor of PC/Computing.

isfaction with the machine. As one member began to explain how it was incompatible with an earlier mini-computer, another broke in, "So what you're saying is, they've done it to us again."

But the roundtables are far more than gripe sessions. Members talk about their experience with a particular technology and share solutions.

"We're a solutions-oriented group," says Horwich. "We're all paid to solve problems."

The best solution may not be a technical one. For example, a group that discussed the problem of users who incorrectly format their diskettes arrived at this solution: apply color-coded stickers to the various types of disk drives and buy diskettes in boxes with colors to match. ■

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(713) 524-2572
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Interests: IBM PC and compatibles.

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Dallas, Tex. 75378-0066
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Interests: IBM PC and compatibles.

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Membership: 350
Interests: IBM PC and compatibles.

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Interests: IBM PC and compatibles.

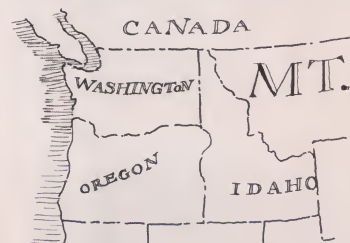
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(312) 948-2618

Information Center Management Association (ICMA)

c/o Robert Schmitt
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1630 W. Olympic Blvd.
Los Angeles, Calif. 90015-3850
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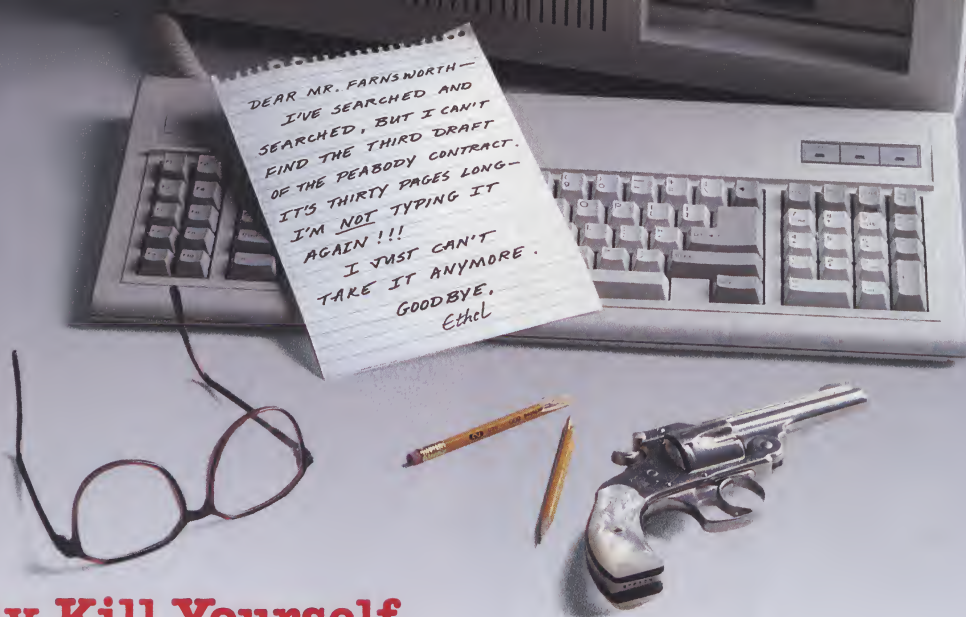


Microcomputer Managers Association, Inc. (MMA)

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Englewood Cliffs, N.J. 07632
Alex Kask, President
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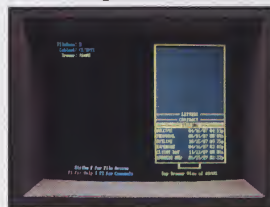
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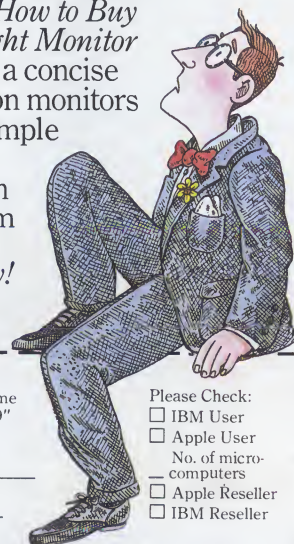
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PCC 10/88





Hard Disk Upkeep: **Tips** **from a Pro**

**How to put the pedal to the metal
and speed up your work, plus take the
drudgery out of daily backups.**

By PAUL SOMERSON

The single most important productivity enhancement for most users is a fast hard disk. A hard disk gives you instant access to all your files, speeds up operation dramatically, and makes "disk full" errors a lot less common. Floppies are used to package new

software products, and you probably use them to back up your files (unless you own a tape drive or Bernoulli box). They're also for the birds.

Hard disks used to be expensive and unreliable. That's all changed. Today they're inexpensive and unreliable. Even the most expensive hard disks are frail and transitory. Many users wedge PC ATs or PS/2s into floor stands beneath their desks, which is fine until they start playing knee-hockey with their systems. Others blithely slide working XT's back and forth across their desks to make room for paperwork,

or routinely lift a corner of the chassis to retrieve something that's burrowed beneath it.

You've all probably seen versions of the famous illustration where a human hair, a smoke particle, and even the greasy schmutz of a fingerprint seem enormous compared with the gap between the magnetic head of a hard disk and the rotating disk platter itself. With tolerances slightly above the angstrom level, dropping a chassis a quarter inch, or tapping it with your toe, is the hard disk equivalent of an atom bomb going off directly overhead.

ILLUSTRATION BY HENRIK DRESCHER

It's true that packages like The Norton Utilities and Mace Utilities, and even the pathetic DOS Recover command, can rescue parts of text files that remain intact after a bounced magnetic head has plowed little oxide furrows into the disk surface. But these programs aren't very good at resurrecting program files or chunks of data stored in binary format. And when you see a message like

General Failure error reading drive C
Abort, Retry, Ignore?

... well, that's what backups are for.

If you set up your hard disk properly, you'll not only take the anguish out of daily backups, but you'll also end up working a whole lot smarter and more efficiently. While you'll have to learn how to handle subdirectories, the tips provided here should make it a breeze. Once you master the basics—and install the tools provided here—you'll be able to solo with the best of them.

Many users who are either lazy or befuddled by the terse explanation of subdirectories in the DOS manual end up dumping all their files into the main, or root, directory.

You really need only three files in your root directory: Command.com, Autoexec.bat, and Config.sys.

Command.com is the primary command interpreter, processor, and loader that watches what you type at the DOS prompt. When it sees you trying to execute an "internal" command such as Dir, Type, Rename, Copy, or Erase, it can dispatch these right away, since the main routines for these are stored inside Command.com (which is why they're called internal commands). When it can't find an internal command to match what you typed—such as Format, or Sort, or 123—DOS looks in a set of directories you specify (the Path) for files with .com, .exe, or .bat extensions and tries to load or execute these external commands. In addition, a disposable part of Command.com looks for the startup Autoexec.bat file and executes it immediately after bootup if it finds one.

Every hard disk system should have an Autoexec.bat file. It's handy for loading resident "pop-up" programs like SideKick into memory, changing screen colors, setting operating modes (to switch monitors or specify communications protocols, for instance), copying files into RAMdisks, and otherwise automatically configuring your system the way you like it.

The Config.sys File

Your system will run without a Config.sys file, but will work better with one than without. And certain programs demand one. If you're using a database manager, for instance, that handles more than eight

Paul Somerson is editorial director of PC/Computing.

open files at once, you have to prepare DOS for juggling the extra ones with a Files= command in Config.sys. You can also do things like use the Country= command to mix and match foreign currency symbols and odd time and date formats.

But where Config.sys really shines is in increasing disk-read buffers, loading device drivers, and adding logical drives to your system.

For some odd reason, IBM specified a default of two buffers for the XT and a paltry three for the AT. Buffers are simply chunks of memory set aside to store the data your system most recently read from or wrote to your disk.

Buffer needs vary from system to system, and the number of buffers is often a topic of heated discussion when tech types get together. Virtually everyone agrees that three is a joke. Somewhere around 10 or

Many users, either lazy or befuddled by the terse explanation of subdirectories in the DOS manual, end up dumping all their files into their main, or root, directories.

15 seems right for XT users, and 20 or 30 for AT users and beyond. Specifying too many is as detrimental to performance as too few, since your system will end up wasting time churning through data it will never use.

Config.sys is also where you instruct your system to load device drivers such as the DOS Vdisk.sys "virtual disk" (RAMdisk), or other instructions to link your basic hardware with mice, nonstandard external storage devices, or 3 1/2-inch floppy drives.

And it's where you tell DOS how many drives you're going to want to use. When you boot up, DOS assumes a maximum of five (drives A through E). But if your system is loaded to the gills with hard disks, half-heights, microfloppies, and other exotica, you might need more.

Some users don't mind having their important DOS utilities in their root directory and cut through the clutter of a messy directory with a Dir/P (paused directory) or Dir/W (wide directory) command. This won't radically degrade performance and may actually be a hair faster than storing them in a separate \DOS subdirectory, if these files are kept at the very beginning of the hard disk directory. But it's even faster to keep them on a RAMdisk. And clutter gets to be a bad habit.

Remember—if you really want to organize your hard disk properly, don't put any files on your root directory other than the ones mentioned above.

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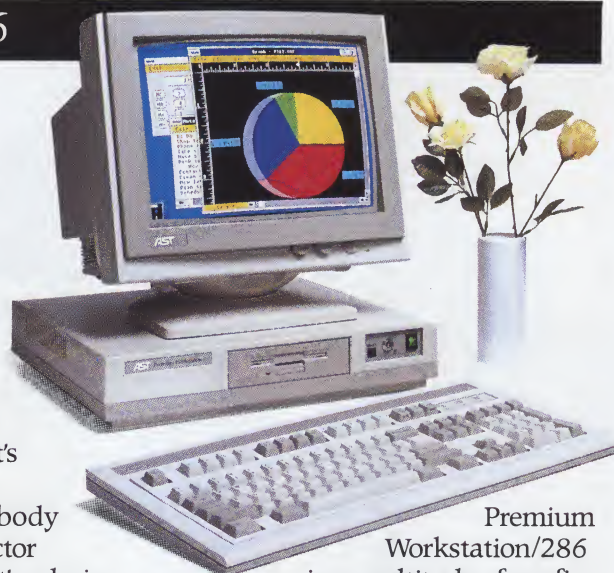
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Then, when you type:

```
DIR C:\
```

all you'll see is one screenful of your bootup files and main subdirectory listings. It'll be an index into your hard disk.

The DOS RAMdisk

As every power user knows, a RAMdisk is a section of memory that some software has tricked DOS into treating like an additional physical disk drive. RAMdisks are far faster than even the fastest hard disks, since they contain no moving parts. The trade-off, of course, is that RAMdisks are volatile; all data stored on them vanishes when you turn the power off or when the current in your wall socket hiccups.

To install the free RAMdisk that comes with later

Automatic installation programs can be downright dangerous. Some replace your versions of Autoexec.bat and Config.sys with their own. Others hide files.

versions of DOS, make sure the DOS Vdisk.sys program is in your C:\DOS subdirectory, and include a line in your Config.sys file that says:

```
DEVICE=C:\DOS\VDISK.SYS
```

This command will set up a virtual drive D with 64K of available space. If you want a larger RAMdisk, you can specify the number of kilobytes at the end of the command. So, for instance,

```
DEVICE=C:\DOS\VDISK.SYS 360
```

would set up a drive D that's the same size as a standard double-sided floppy. However, IBM won't let you Diskcopy into it. RAMdisk software from other manufacturers, such as AST's SuperDRV, will let you use the Diskcopy command. IBM's Vdisk driver will let you create multiple virtual disks, configure the sector size and number of directory entries, and, in the most recent versions of DOS, use extended memory.

The trick is to figure out which major programs, batch files, and utilities you use frequently and insert a cascade of commands in your Autoexec.bat file to copy those files to the RAMdisk. Then make sure your path includes this new drive. In the example used above, the path would now look like:

```
PATH=D:\; C:\DOS; C:\BIN
```

Putting D:\ first means that the root directory of the RAMdisk is the first place DOS will look.

It's smart to put all your batch files except the tiniest ones into a RAMdisk, since batch files execute one slow line at a time. Watching even a hard disk grind its way through a medium-sized batch file is no fun at all.

Protecting Autoexec.bat and Config.sys

Most software packages these days either come with instructions that suggest creating one or more dedicated subdirectories or have their own installation programs that do it automatically.

However, these automatic installers can be downright dangerous. Some replace your versions of Autoexec.bat and Config.sys with their own. Others hide files, which makes it difficult to remove subdirectories.

You can get around the first problem by using the Type or More command or your word processor to examine the .bat and installation programs. If you see a command that simply copies program versions of Autoexec.bat and Config.sys to your hard disk, you can use your word processor to adapt your existing files rather than watching them get trashed.

A smart idea is to maintain a small subdirectory called \BACKUP containing nothing but your current versions of Command.com, Autoexec.bat, and Config.sys. Every time you update one of these, copy it to the \BACKUP subdirectory. Then when a program installs itself destructively, you can type:

```
COPY \BACKUP \
```

Hidden Files

Hidden files can be a real problem with subdirectories. Few users keep the same subdirectory structure for very long. Most end up cutting and pasting branches of the tree as they get more sophisticated or desperately short of space, or when they replace outdated application packages with newer ones.

The RD command removes subdirectories, but only when they're empty. If you've left even one file or lower-level subdirectory in them, you won't be able to expunge the subdirectory.

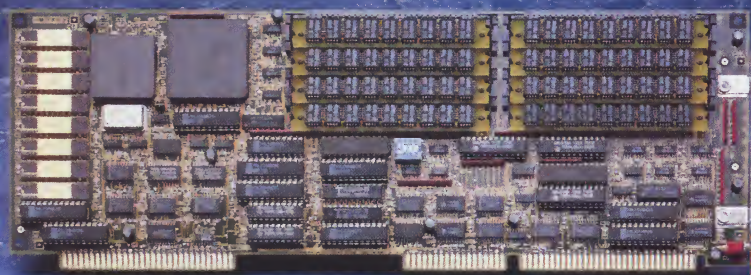
Some programs, in spiteful attempts at copy protection, install hidden files that you can't see in normal directory searches. If you try to remove a subdirectory that you think is empty, and you see this message:

```
Invalid path, not directory,  
or directory not empty
```

first check to see if you've left any subdirectories branching off the one you want to get rid of. If so, you have to move or erase the contents of those lower-level subdirectories first, then use the RD command to remove them.

If you can't see any files or lower-level subdirectories, some nasty application has probably planted a

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CIRCLE NO. 276 ON READER SERVICE CARD.


```

DEBUG
E 100 BB 80 00 43 80 3F 20 74 FA 89 DA 43 80 3F
E 10E 0D 74 05 80 3F 00 75 F5 C6 07 00 B0 00 B4
E 11C 43 CD 21 81 C9 02 00 B0 01 B4 43 CD 21 CD 20
RCX
2B
N HIDE.COM
W
E 120 E1 FD
N UNHIDE.COM
W
Q

```

Figure 1. This simple program uses Debug to create two files: Hide.com, which lets you hide files, and Unhide.com, which . . . you got it . . . unhides them.

hidden file somewhere. You can check on this by executing the

```
CHKDSK /V | MORE
```

command, which will show all the files on your disk a screenful at a time, including the hidden ones. Make sure Debug.com is handy and type in the 12 lines shown in Figure 1.

This will create two new files, Hide.com and Unhide.com. To hide a file like Autoexec.bat, type:

```
HIDE AUTOEXEC.BAT
```

To unhide it, type:

```
UNHIDE AUTOEXEC.BAT
```

Warning: Some especially nasty commercial software packages not only hide files but scramble the arrangement of DOS sectors associated with the hid-

Some installation programs change things as they proceed. If the installation process is so dumb that it doesn't know when something's gone wrong, you may have trouble reinstalling things.

den file. If at all possible, always try to use the deinstallation program that came with the software package before using a utility like Unhide to reveal the program so you can erase it.

Be careful when hiding files en masse. If you issued a command such as:

```
FOR %A in (*.*) DO HIDE %A
```

you'd end up with a whole directory of hidden files. You won't be able to use a similar command to unhide them, since DOS won't see any files to unhide. You'll have to unhide all your files individually, since wildcards don't work with hidden files. The safest

thing to do if you hide lots of files is first create a master file listing all the filenames, and put this master file in some other directory or on some other disk. If you're on drive C you could use a command like:

```
DIR > B:C-HIDDEN.LST
```

Some awful installation programs change things as they proceed. They may rename a driver file on the original disk or delete files once they've copied them to a hard disk. If the installation process is interrupted, or if it's so dumb that it doesn't know when something's gone wrong, you may have trouble reinstalling things later.

Another clever way to prevent having software packages replace or otherwise modify Autoexec.bat is to make your Autoexec.bat tiny and have it run another startup batch file with a different name that does all the real work. This way, if something clobbers the file on your disk named Autoexec.bat, it won't hurt your real startup file.

To do this, just put the following two lines in your

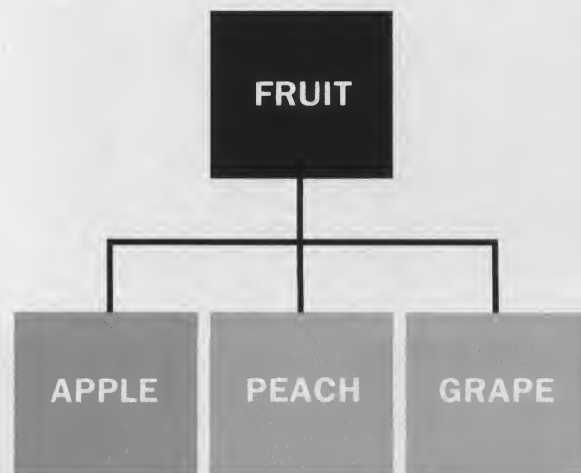


Figure 2. You can move among subdirectories in this tree by typing `CD ..\GRAPE` or `CD ..\PEACH`.

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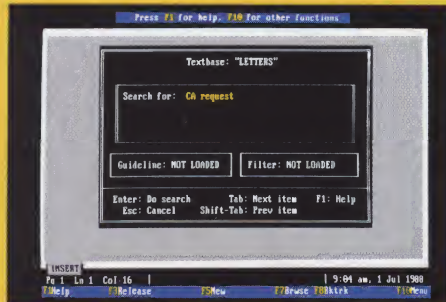
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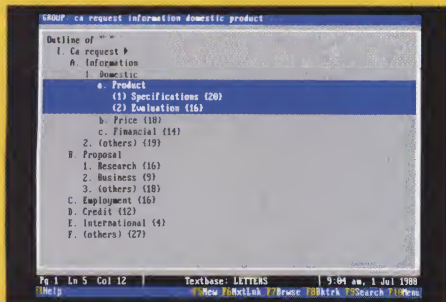
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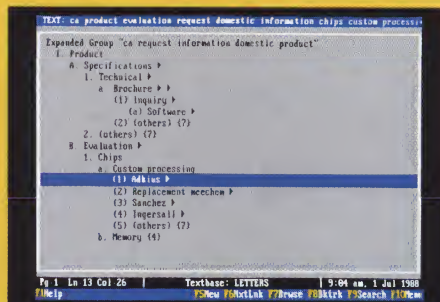
0:00:05 With IZE open, a request is made.



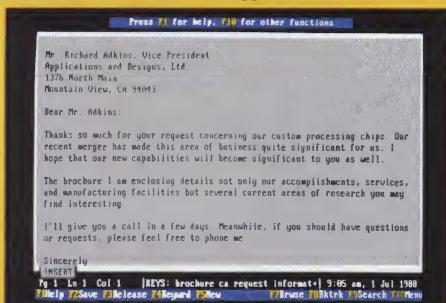
0:00:17 In seconds, IZE organizes the facts.



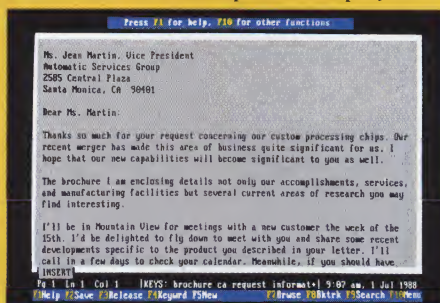
0:00:24 An outline appears to scrutinize.



0:00:35 The outline expands to sharpen focus.



0:01:01 The facts are found ready to revise.



0:03:20 A new, customized letter is ready to print.



It's easy to create new subdirectories and move around inside existing ones if you remember to have the right tools handy.

Autoexec.bat:

```
ECHO OFF
SETPATH STARTUP
```

All this does is execute another batch file called Setpath.bat:

```
SET NORMPATH=C:\DOS; C:\UTIL; C:\
PATH %NORMPATH%
%1
```

Setpath.bat sets the path, then executes the Startup.bat file, since its %1 replaceable parameter refers to the word Startup in the last line of the Autoexec.bat file.

The Startup.bat file contains all commands you normally would have placed in an Autoexec.bat file:

```
PROMPT $P$G
PRINT /D:PRN /Q:32
CARDFILE C:\UTIL\CARDFILE.TXT
DOSKEY
CTYPE /MA
SPEEDUP
```

There are several advantages to this technique:

- The Autoexec.bat file is easy to re-create if it is destroyed or inadvertently modified.
- The Path command is in its own separate batch file, making it easy to change if directories are added or removed.
- The Setpath.bat file makes it easy to restore the default path if it has been changed.
- By creating a batch file like Addpath.bat:

```
PATH %NORMPATH%;%1
```

it's easy to add a new directory to the path temporarily and then restore it later with Setpath.bat. Don't try this with buggy DOS 3.0, however.

Another ingenious protection solution is to change Command.com so it looks for a file with a name other than Autoexec.bat. In fact, the first file Command.com tries to execute doesn't even have to end in .bat.

Subdirectory Navigation

It's easy to create new subdirectories and move around inside existing ones if you have the right tools handy and follow a few simple rules.

The first rule is to remember that whenever you want to move up—toward the root directory—all you have to do is type:

```
CD ..
```

This jumps you to each successive parent directory. However, since when you finally land in the root directory, you can't move up any other levels, trying to do so will produce an

Invalid directory

message.

If you're in a subdirectory five levels deep called

```
LEV1\LEV2\LEV3\LEV4\LEV5
```

(you, of course, will be able to tell this by looking at the C:\LEV1\LEV2\LEV3\LEV4\LEV5: prompt that your Prompt \$P: command displays) and you want to

Figure 3. This file, Batmakr1.bas, creates lots of small batch files that let you zap through the maze of subdirectories on your hard disk.

```
100 'BATMAKR1.BAS - by Paul Somerson
110 ' ©1987 Ziff Communications Co.
120 'This creates easy subdirectory switcher files
130 'Before you use this, get into DOS and type:
140 '
150 '      CHKDSK / V ! FIND "Dir" > TEMPFIL
160 '
170 'For this to work properly, make sure each
180 '      subdirectory has its own unique name.
190 'To switch between subdirectories in DOS, type
200 '      name of the subdirectory WITHOUT the CD\
210 '      prefix, and WITHOUT the long PATHname
220 '      that usually precedes it.
230 'For instance, to switch to \DOS\BIN, just
240 '      type:      BIN
250 ON ERROR GOTO 440
260 '
270 ' — read raw file, truncate left end of each line —
280 '
290 OPEN "tempfile" FOR INPUT AS #1
300 IF EOF(1) THEN 430 ELSE LINE INPUT #1, A$
310 A$=RIGHT$(A$,LEN(A$)-12):IF A$="" THEN 300
320 FOR A=LEN(A$) TO 1 STEP -1
330 IF MID$(A$,A,1) < ">" THEN 350
340 NM$=RIGHT$(A$,LEN(A$)-A)+".BAT":GOTO 390
350 NEXT
360 '
370 ' — start churning out the batch files —
380 '
390 PRINT "Creating ";NM$;" batch file . . ."
400 OPEN NM$ FOR OUTPUT AS #2
410 PRINT #2,"CD"+A$::CLOSE #2
420 GOTO 300
430 CLOSE:KILL "tempfile.":PRINT:LIST 170-240:END
440 IF ERR=53 THEN LIST 130-160 ELSE ON ERROR GOTO 0
```


C>ERASE *.*

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jump back to the root directory, you can do this the easy way, by typing:

```
CD \
```

or you can jump upward a level at a time by typing

```
CD ..
```

once and then tapping the F3 key four more times. Each time you do, DOS will repeat the earlier command, and since that command is CD .. it will bounce you rapidly rootward.

(Get to know the F3 key, since it's a real labor saver. For instance, if you're creating a lower-level subdirectory with the MD command, and you make a typing mistake and end up creating one that's spelled wrong, all you have to do is immediately type an R and then press F3. This will send DOS an RD (Remove Directory) command to eradicate the erroneous one you just created. The syntax of making and removing directories is identical except for the first

letter of the command, and once you type in the new first letter, F3 will dredge up the rest.)

To move in the other direction, down from the root directory to \LEV5, you could, of course, simply type this:

```
CD \LEV1\LEV2\LEV3\LEV4\LEV5
```

You can't type:

```
CD \LEV5
```

since that would tell DOS to jump you into a subdirectory called \LEV5 that was just one level down from the root directory. The real name of the \LEV5 subdirectory above is not just \LEV5; it's \LEV1\LEV2\LEV3\LEV4\LEV5.

When you're on one branch of a tree, it's easy to bounce around from one subdirectory to another on the same level. If you have a tree that looks like the one illustrated in Figure 2 and you're currently in \FRUIT\APPLE, and you want to jump to \FRUIT

Figure 4. Batmakr2.bas creates a big file that will help you do your zapping.

```

100 'BATMAKR2.BAS - by Paul Somerson
110 '© 1987 Ziff Communications Co.
120 'This creates easy subdirectory switcher files
130 '(And puts them all in one very long file.)
140 'Before you use this, get into DOS and type:
150 '
160 '      CHKDSK /V: FIND "Dir" > TEMPFILE
170 '
180 'For this to work properly, make sure each
190 '      subdirectory has its own unique name.
200 'To switch between subdirectories in DOS, type
210 '      S and then the name of the subdirectory
220 '      WITHOUT the "CD\" prefix, and WITHOUT
230 '      the long PATHname that usually precedes it.
240 'For instance, to switch to \DOS\BIN, type:
250 '      S BIN
260 'DON'T run S.BAT on a floppy disk. For best
270 '      results, run it on a RAMdisk you've PATHed to.
280 '
290 DIM B$(300),C$(300),F$(300)
300 ON ERROR GOTO 790
310 '
320 ' - read raw file, truncate left end of each line -
330 '
340 OPEN "tempfile" FOR INPUT AS #1
350 IF EOF(1) THEN 500 ELSE LINE INPUT #1, A$
360 B$(K)=RIGHT$(A$,LEN(A$)-10):IF B$(K)="" THEN 350
370 FOR A=LEN(B$(K)) TO 1 STEP -1
380 IF MID$(B$(K),A,1)="" THEN C$(K)=RIGHT$(B$(K),LEN(B$(K))-A):GOTO 430
390 NEXT
400 '
410 ' - create lowercase version of each test -
420 '
430 FOR D=1 TO LEN(C$(K))
440 F$(K)=F$(K)+CHR$(ASC(MID$(C$(K),D,1)) OR 32)
450 NEXT
460 K=K+1:GOTO 350
470 '
480 ' - write uppercase and lowercase tests to S.BAT -
490 '
500 OPEN "S.BAT" FOR OUTPUT AS #2
510 PRINT #2,"ECHO OFF"
520 PRINT #2,"IF %1 @==@ GOTO ERROR2"
530 FOR A=1 TO K-1
540 PRINT #2,"IF %1==";C$(A);" goto ";C$(A)
550 PRINT #2,"IF %1==";F$(A);" goto ";C$(A)
560 NEXT
570 PRINT #2,"GOTO ERROR1"
580 '
590 ' - write actual CD instructions to S.BAT -
600 '
610 FOR A=1 TO K-1
620 PRINT #2,";" + C$(A)
630 PRINT #2,"CD" + CHR$(32) + B$(A)
640 PRINT #2,"GOTO END"
650 NEXT
660 '
670 ' - write error-handling and ending routines to S.BAT -
680 '
690 PRINT #2,":ERROR1"
700 PRINT #2,"ECHO Subdirectory %1 not found. Try again."
710 PRINT #2,"GOTO END"
720 PRINT #2,":ERROR2"
730 PRINT #2,"ECHO You must enter a subdirectory name after %0"
740 PRINT #2,":END"
750 '
760 ' - cleanup and error routine -
770 '
780 CLOSE:KILL "tempfile,":PRINT:LIST 180-270:END
790 IF ERR=53 THEN LIST 140-170 ELSE ON ERROR GO TO 0

```

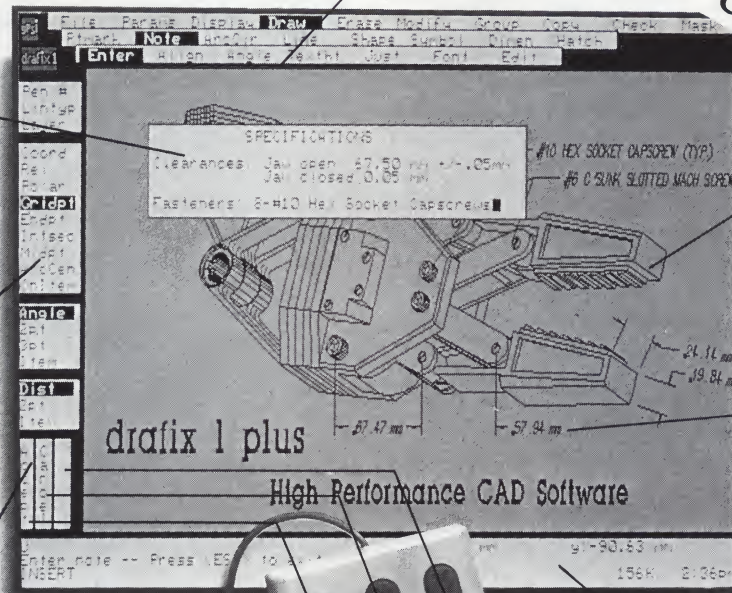

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\GRAPE, you can type:

```
CD ..\GRAPE
```

since the .. is shorthand for the parent directory (\FRUIT).

But jumping from one deep branch of your subdirectory structure to a completely different branch can be a bad typist's nightmare.

The trick is to create either a slate of small batch files—or one big batch file—to do all the switching.

You can create a new batch file every time you issue an MD command to create a new subdirectory. Or you can run one of the two Basic programs shown in Figures 3 and 4. Batmakr1.bas (Figure 3) creates lots of small individual batch files. Batmakr2.bas (Figure 4) creates one big batch file. Each has its advantages and disadvantages.

It's far faster to have individual batch files, since they run more quickly. But even though each batch file may be only 20 or 30 bytes long, each takes up whatever the minimum cluster size is on your hard disk. On an XT running under DOS 2.0 or later, this is a mind-bending 4K. On an AT under 3.0 or later, it's a more manageable 2K. Put a hundred of these small files on your hard disk and you start chewing up valuable real estate.

The advantage of using one big file is that it takes up far less space. The severe disadvantage is that it executes ponderously slowly. This is because one big batch file has to test your input and match it against all the subdirectories on your disk to see which one to switch to. Batch files execute one slow line at a time, so on a slow XT hard disk the process can take 10 or 20 seconds if the subdirectory you want is at the very bottom of the list of tests. If you are tight for space and want to use the one-big-file method, put a command in your Autoexec.bat file to copy this subdirectory switcher to a RAMdisk, and run it from there.

Finding Files

Users have their own favorite ways to find files buried deep inside a long-forgotten subdirectory. By executing a simple Findfile.bat batch file (Figure 5), you can have DOS do it.

Findfile exploits the /V feature of Chkdsk.com. The /V option lists all files in all subdirectories, but

```
ECHO OFF
IF %1==! GOTO OOPS
ECHO NOW SEARCHING DIRECTORIES FOR "%1"
CHKDSK /V ;FIND 1"%1";MORE
GOTO END
:OOPS
ECHO Enter a filespec (or part of one) after %0
:END
```

Figure 5. The Findfile.bat batch file helps you find those files which are not gone, just forgotten.

you wouldn't know this from some of the early DOS manuals, which describe it with meaningless remarks like saying it will "display a series of messages indicating its progress, and provide more detailed information about the errors it finds." The more recent editions are a little clearer.

Adding a /V switch makes it a snap to search for a particular file. Findfile pipes the output of CHKDSK /V through the Find.exe and More.com filters, so you have to have these DOS utilities on the same subdirectory as Findfile.bat or in a directory your Path knows about.

If you wanted to search for Basica.com, for instance, you would simply type:

```
FINDFILE BASICA
```

If you typed:

```
FINDFILE BASIC
```

the batch file would locate both Basic.com and Basica.com, and any other filename with the capital letters BASIC in it. You may also use parts of names. Typing

```
FINDFILE ASICA
```

would find Basica.com. This comes in handy if you want to look for files with the same extensions. Enter:

```
FINDFILE .COM
```

and you'll see all your .com files. Remember to enter capital letters only. And don't put quotes around the filenames or parts of filenames you want to find—the batch file will do this for you automatically. Findfile won't display a special message telling you no matches were found if it comes up empty. But this will be obvious when no matches are displayed on your screen.

The only real problem with this is that Findfile.bat is slow, especially on a nearly full hard disk, since it has to pipe hundreds or thousands of filenames through a filter and create temporary files while it does so. You could redirect the output of CHKDSK /V into a file and adapt Findfile so it looks at the existing list of filenames instead of having to re-create the list each time. The trade-off is that such a list has to be updated frequently and ends up always being at least a bit out of date.

Moving Files

When users normally move a file from one subdirectory to another, they first copy the file with the Copy command and then use Erase to delete the original. Or they write a short batch file to do it:

```
COPY %1 %2
ERASE %1
```

The problem with such a batch file is that if an in-

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correct destination is specified, it can fail to make the copy but then go ahead and erase the original anyway. A better way is to use the Moveit.bat batch file (Figure 6).

Moveit.bat starts by checking to see if you entered the correct number of parameters and gives you a help message if you didn't. It then copies the file,

```
ECHO OFF
IF NOT %2! == ! GOTO TEST
ECHO You must specify what to move
ECHO and where to move it to, eg:
ECHO %0 CHKDSK.COM \DOS
GOTO END
:TEST
IF NOT EXIST %2\%1 GOTO COPY
ECHO %1 is already in %2
ECHO To prevent overwriting %1, press
ECHO Ctrl-Break right now. Otherwise
PAUSE
:COPY
COPY %1 %2\%1 > NUL
IF NOT EXIST %2\%1 GOTO ERROR
ERASE %1
GOTO END
:ERROR
ECHO Error in destination specified, or
ECHO the file to be moved is not in
CD
:END
```

Figure 6. Moveit.bat lets you use wildcards to move files, but if it's to work, you must be in the same directory as the file you are trying to move.

using %2\%1 so you don't have to spell out the name of the file in both locations (wildcards will work). However, this limits you a bit, since you have to be in the directory of the file you are trying to copy. (You could modify it to COPY %1 %2 if you like, which would allow you to copy files without having to first log into the files' subdirectory—but you would have to spell out the name of the file in both places.) Finally, it will erase the original file only if it finds the new one.

It's smart to confirm that the copy was indeed made before deleting the original. But versions of DOS earlier than 3.0 will have problems with If Exist tests and Paths.

Moveit.bat checks to make sure the file isn't already at the destination subdirectory before you copy it, which prevents you from accidentally overwriting files. If you see a message warning you that you're about to obliterate an existing file, just press Ctrl-Break and then the Y key to abandon the process. Otherwise, press any key to proceed.

Fine-Tuning Your System

While DOS limits the number of files you can shoe-horn into the root directory—and smart users know

to keep their root directories small—the number of files in each of your subdirectories is limited only by the amount of space on your disk.

But it's not wise to let your subdirectories get too big, unless you have an easy way to back them up.

Do get into the habit of backing up regularly. The morning you turn your system on and hear a sound like a wrench in a blender, you'll be glad you did.

If you're working on something time-sensitive and critically important, stop frequently while you're working and make a working copy to a floppy. It is possible to corrupt a hard disk if you're writing to it

If you don't yet own a hard disk, buy one. And no matter what kind of hard drive you buy, don't buy trouble. Make sure it's (1) safe, and (2) fast.

and the local power company decides that moment would be a good one to switch generators. You can set up a batch file to automate the process. (See "Best Bets for Better Backup," *PC/Computing*, August 1988, page 166.) Otherwise you might end up spending the rest of the evening patching together little shards of your work that you've fished out of the magnetic murk.

If you notice that performance is degrading, or hear the percussive rhythm of repeated read retries, run Norton's Disktest program. This takes a few minutes, but can ferret out developing programs and zap out bad sectors better than DOS can. And if Norton reports grief, back up everything pronto and hie down to your dealer. When hard disks start whimpering they go downhill real fast. Hard disk problems never just go away.

Caveat Emptor

If you don't yet own a hard disk, remember, no matter what kind of hard drive you're considering, don't buy yourself trouble. Make sure it's (1) safe, and (2) fast. While no hard disk is immune to potential disaster, some are more fragile than others. Since most users back up their data infrequently, a hard disk problem can wipe out weeks of work.

Don't buy a hard disk unless its heads retract automatically when you turn the power off. Otherwise, they'll just drop down to the disk and take a bite out of whatever data's there. ▀

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POST! Hey, Mister, Want to Buy Some Software Cheap?

**Software piracy as a way
of life in Hong Kong.**

By CHRISTOPHER JOHNSTON

Ask anyone on the streets of Hong Kong where to buy software and you will probably be directed to the Golden Computer Arcade. From the Sham Shui Po subway station on the Kowloon side, follow the sign to Fuk Wa Street. The Golden Computer Arcade occupies the first two floors of the Golden Shopping Center there.

If Sham Shui Po is too remote, try the Hong Kong Computer Center in Wan Chai, home to some of Hong Kong's most reputable computer companies, located right across the street from the Ramada Inn.

Both places serve up terrific deals, and both offer postpurchase service and support. They'll also put international clients on an English-language mail order list, so you needn't worry about missing out on program updates.

What's wrong with this picture?

Nothing and everything. This is high-tech life in Hong Kong, where computers

PHOTOGRAPHS BY LEONG KA TAI





Despite the protest of U.S. software publishers and periodic raids by the Hong Kong Customs and Excise Department, the Golden Computer Arcade and the Hong Kong Computer Center remain pirates' havens.



are big business and U.S. software publishers are nervous. Much of the software available at the Golden Computer Arcade and the Hong Kong Computer Center is pirated from U.S. publishers. The manuals are reprinted, complete with cover art, and shrink-wrapped with the pirated program copies. The new packages are then sold for a fraction of stateside list prices.

Christopher Johnston is a screenwriter and a frequent contributor to the Village Voice. He is currently working on a novel.

Ashton-Tate's dBase III Plus Version 1.1, which retails for \$695 in the United States, sells in Hong Kong for the equivalent of \$33. IBM OS/2, which sells for \$325 in the U.S., goes for \$24. Borland International's \$199.95 SideKick Plus is a mere \$11.50. At a time when legitimate copies of WordPerfect 5.0 were in great demand and difficult to find in the U.S., pirated versions of the program were selling in the Golden Computer Arcade for \$34.50.

Games are sold in the Arcade, too. Single diskettes packed with as many PC

**Like the drug trade in the United States,
Hong Kong's illicit computer markets will last
as long as the demand exists.**

games as 360K can accommodate cost about \$3.85.

These are merely stated prices, of course. As with most goods in Hong Kong, shoppers are expected to bargain vendors down by 30 to 50 percent. Nobody pays retail.

Almost all the PC hardware in Hong Kong is cloned, and the BIOS and ROM rip-offs come from the real McCoys. Despite the protests of U.S. software publishers and periodic raids by the Hong Kong Customs and Excise Department, the Golden Computer Arcade and the Hong Kong Computer Center remain pirates' havens. At best, the raids have made vendors more cautious, driving prices up slightly. Like the drug trade in the United States, Hong Kong's illicit computer markets will last as long as the demand exists.

East Meets West

Business is brisk in the Golden Computer Arcade. Tables piled high with bins of chips, naked motherboards, modem cables, and peripheral cards line the aisles in front of plate-glass storefronts. Amid the din of firecracker Cantonese and pidgin English, young Chinese bustle through the crowd with newly purchased IBM clones and laptop knockoffs.

In a corner shop, a slight, bespectacled vendor I'll call Jamie Wong paces about, eager to help customers choose word processors or to argue the value of RAM-resident programs. At 22, he is strikingly younger than the other hawkers along the arcade. A partner behind the counter brushes back his streaked hair and sings along to Pink Floyd's "Another Brick in the Wall," which blares from speakers at his back.

Wong has IBM software publishers to thank for his computer education. He can't get into college, because competition in Hong Kong is too stiff. And he couldn't spare the time away from his job anyway. He won't say how much he makes selling software, but he agrees it's better than an average job. Hong Kong has no minimum wage; incomes range from about \$200 to \$780 per month. An

office clerk's salary averages \$389 a month, while a supervisor's salary can run to \$650 or more.

Wong and his partners spend their days smoking cigarettes, listening to CD recordings of heavy metal bands (Iron Maiden and Led Zeppelin are favorites), and haggling with customers. "We make money because legitimate software is so expensive," Wong says. "Hong Kong people can't afford to learn computers. But because of us, they can."

Legitimate PC software can cost well over twice as much in Hong Kong as it does in the U.S. Also, there isn't as wide a range of shareware available. Like most hawkers in the Golden Computer Arcade, Wong and his cohorts take credit



Wary hawkers at the Golden Computer Arcade display only manuals. They'll copy the software for you on the spot.

Stated prices mean little at the Golden Computer Arcade. Shoppers are expected to haggle prices down by 30 to 50 percent.

cards, and they even offer after-sales support. "You send us a telex or call us collect if you have a question or a bad disk," Wong says. "We'll replace it at no charge."

The ethical issue of selling stolen software is academic in Hong Kong. The only country it borders is the People's Republic of China. Most Hong Kong Chinese fled China after 1949 or during the Cultural Revolution of the 1960s. In

1997, control of the British Crown Colony will revert to China. Local merchants face an uncertain future.

"I want to get out of Hong Kong before '97," Wong says. "People in Hong Kong hate heavy metal anyway, so what will happen to us then?" Indeed, the icy regard most locals hold for pop culture promises to get no warmer under the new regime. "I want to be able to go to the States, or maybe Brazil." Peddling ripped-off software will earn Wong the money to emigrate.

Today, Wong's shop has more than 200 titles. Most of them were pirated from U.S. software publishers, though the selection includes a word processor and a spreadsheet program from Taiwan. The word processor pirate hacked a start-up screen that says in Chinese, "No copy protection. Copying encouraged. Copying software is the only way to tell good software from bad."

Computer hardware—legitimate or not—is also cheap in the Golden Computer Arcade. The Hong Kong Computer Center, whose companies cater to legal computing needs, houses a seedy periphery in its lobby. But the Golden Computer Arcade is a computer pirate's free-for-all. The circuitry on silicon boards is soldered together on the premises, and everything is a bargain. My palms got itchy when I saw an 80386-based workstation complete with hard disk, EGA monitor and card, and 1MB RAM selling for less than \$1,000. Of course, how long such a counterfeit system will last is another matter.

New keyboards can be had for as little as \$6.50; slightly damaged ones cost \$1.30. Despite the DRAM chip shortage, 256K chip sets are available for \$10. After picking my jaw up off the floor, I bought a power cord for my NEC Multi-Speed laptop for only \$1.80. It works just fine.

The only Japanese software I saw in Hong Kong was game cartridges that

plug into Nintendo's handheld computer. The cartridges are largely graphics-based and offer 3-D game resolution equal to that of standalone video games—except that they run on a television or color monitor.

Users who want to keep abreast of the computing industry can buy computer books in English or Chinese, or copies of any computer magazine available stateside. Even magazines aren't safe from piracy. I found a Chinese guidebook to the IBM PC AT; a photograph of an ax smashing an AT graced its cover. The same photo had appeared on the cover of *PC Magazine* in April 1986.

I found no Apple Macintosh or IIe compatibles (and little Apple software) in the Golden Computer Arcade, though I did see a few add-in boards. There is a dearth of Apple rip-offs in Hong Kong, partly because of Apple's reputation for taking action against clone-makers and pirates, partly because the Mac is supposedly harder to reverse-engineer than the IBM PC. Whatever the reason, vendors in the Golden Computer Arcade are such avowed IBM cheerleaders that you'd think they were born and raised in Armonk, New York.

Seven hundred years after opening trade with Asia, Marco Polo would feel at ease in the bazaar atmosphere of the Golden Computer Arcade.

Only the commodities are different. The magnetic media of software, cassettes, and videotapes lend themselves to this Casbah ethic, because they're so easily copied. In Hong Kong, software is an item of inventory to be bought and sold; intellectual property is a Western delusion.

Beating the Rap

It's a fact of life that software is pirated in every part of the world. But what adds insult to software publishers' injuries is that in Hong Kong piracy takes place in

Against All Odds

▶ What are software publishers to do? Band together, that's what. Last November's raid on the pirates of Hong Kong came at the request of several U.S. software companies. The man doing most of the legwork for this coalition (which includes Ashton-Tate, Lotus, and Microsoft) is Tom Chan, deputy general counsel for Ashton-Tate.

Together, the companies hired a detective agency to film the activities at the Golden Computer Arcade. They gathered enough information to curb the piracy business—at least for a week.

"It's tough," says Chan. "Every time there's a personnel turnover in the software companies or in the Hong Kong government, you have to deal with new people. The pirates can simply outlast us."

Chan says the way to beat the pirates is constant pressure: "We have to get the smaller companies to join us." Companies interested in joining the fight against piracy can reach Chan's office at (213) 329-8000.

—CJ

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Bicycle Parts Pacific Order Worksheet

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101-10	Shift cables	1	10.00	1	10.00	260.00
101-11	Brake pads	1	10.00	1	10.00	270.00
101-12	Shifters	1	10.00	1	10.00	280.00
101-13	Spacers	1	10.00	1	10.00	290.00
101-14	Brake cables	1	10.00	1	10.00	300.00
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101-17	Shifters	1	10.00	1	10.00	330.00
101-18	Spacers	1	10.00	1	10.00	340.00
101-19	Brake cables	1	10.00	1	10.00	350.00
101-20	Shift cables	1	10.00	1	10.00	360.00
101-21	Brake pads	1	10.00	1	10.00	370.00
101-22	Shifters	1	10.00	1	10.00	380.00
101-23	Spacers	1	10.00	1	10.00	390.00
101-24	Brake cables	1	10.00	1	10.00	400.00
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101-27	Shifters	1	10.00	1	10.00	430.00
101-28	Spacers	1	10.00	1	10.00	440.00
101-29	Brake cables	1	10.00	1	10.00	450.00
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101-31	Brake pads	1	10.00	1	10.00	470.00
101-32	Shifters	1	10.00	1	10.00	480.00
101-33	Spacers	1	10.00	1	10.00	490.00
101-34	Brake cables	1	10.00	1	10.00	500.00
101-35	Shift cables	1	10.00	1	10.00	510.00
101-36	Brake pads	1	10.00	1	10.00	520.00
101-37	Shifters	1	10.00	1	10.00	530.00
101-38	Spacers	1	10.00	1	10.00	540.00
101-39	Brake cables	1	10.00	1	10.00	550.00
101-40	Shift cables	1	10.00	1	10.00	560.00
101-41	Brake pads	1	10.00	1	10.00	570.00
101-42	Shifters	1	10.00	1	10.00	580.00
101-43	Spacers	1	10.00	1	10.00	590.00
101-44	Brake cables	1	10.00	1	10.00	600.00
101-45	Shift cables	1	10.00	1	10.00	610.00
101-46	Brake pads	1	10.00	1	10.00	620.00
101-47	Shifters	1	10.00	1	10.00	630.00
101-48	Spacers	1	10.00	1	10.00	640.00
101-49	Brake cables	1	10.00	1	10.00	650.00
101-50	Shift cables	1	10.00	1	10.00	660.00
101-51	Brake pads	1	10.00	1	10.00	670.00
101-52	Shifters	1	10.00	1	10.00	680.00
101-53	Spacers	1	10.00	1	10.00	690.00
101-54	Brake cables	1	10.00	1	10.00	700.00
101-55	Shift cables	1	10.00	1	10.00	710.00
101-56	Brake pads	1	10.00	1	10.00	720.00
101-57	Shifters	1	10.00	1	10.00	730.00
101-58	Spacers	1	10.00	1	10.00	740.00
101-59	Brake cables	1	10.00	1	10.00	750.00
101-60	Shift cables	1	10.00	1	10.00	760.00
101-61	Brake pads	1	10.00	1	10.00	770.00
101-62	Shifters	1	10.00	1	10.00	780.00
101-63	Spacers	1	10.00	1	10.00	790.00
101-64	Brake cables	1	10.00	1	10.00	800.00
101-65	Shift cables	1	10.00	1	10.00	810.00
101-66	Brake pads	1	10.00	1	10.00	820.00
101-67	Shifters	1	10.00	1	10.00	830.00
101-68	Spacers	1	10.00	1	10.00	840.00
101-69	Brake cables	1	10.00	1	10.00	850.00
101-70	Shift cables	1	10.00	1	10.00	860.00
101-71	Brake pads	1	10.00	1	10.00	870.00
101-72	Shifters	1	10.00	1	10.00	880.00
101-73	Spacers	1	10.00	1	10.00	890.00
101-74	Brake cables	1	10.00	1	10.00	900.00
101-75	Shift cables	1	10.00	1	10.00	910.00
101-76	Brake pads	1	10.00	1	10.00	920.00
101-77	Shifters	1	10.00	1	10.00	930.00
101-78	Spacers	1	10.00	1	10.00	940.00
101-79	Brake cables	1	10.00	1	10.00	950.00
101-80	Shift cables	1	10.00	1	10.00	960.00
101-81	Brake pads	1	10.00	1	10.00	970.00
101-82	Shifters	1	10.00	1	10.00	980.00
101-83	Spacers	1	10.00	1	10.00	990.00
101-84	Brake cables	1	10.00	1	10.00	1000.00
101-85	Shift cables	1	10.00	1	10.00	1010.00
101-86	Brake pads	1	10.00	1	10.00	1020.00
101-87	Shifters	1	10.00	1	10.00	1030.00
101-88	Spacers	1	10.00	1	10.00	1040.00
101-89	Brake cables	1	10.00	1	10.00	1050.00
101-90	Shift cables	1	10.00	1	10.00	1060.00
101-91	Brake pads	1	10.00	1	10.00	1070.00
101-92	Shifters	1	10.00	1	10.00	1080.00
101-93	Spacers	1	10.00	1	10.00	1090.00
101-94	Brake cables	1	10.00	1	10.00	1100.00
101-95	Shift cables	1	10.00	1	10.00	1110.00
101-96	Brake pads	1	10.00	1	10.00	1120.00
101-97	Shifters	1	10.00	1	10.00	1130.00
101-98	Spacers	1	10.00	1	10.00	1140.00
101-99	Brake cables	1	10.00	1	10.00	1150.00
101-100	Shift cables	1	10.00	1	10.00	1160.00
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101-102	Shifters	1	10.00	1	10.00	1180.00
101-103	Spacers	1	10.00	1	10.00	1190.00
101-104	Brake cables	1	10.00	1	10.00	1200.00
101-105	Shift cables	1	10.00	1	10.00	1210.00
101-106	Brake pads	1	10.00	1	10.00	1220.00
101-107	Shifters	1	10.00	1	10.00	1230.00
101-108	Spacers	1	10.00	1	10.00	1240.00
101-109	Brake cables	1	10.00	1	10.00	1250.00
101-110	Shift cables	1	10.00	1	10.00	1260.00
101-111	Brake pads	1	10.00	1	10.00	1270.00
101-112	Shifters	1	10.00	1	10.00	1280.00
101-113	Spacers	1	10.00	1	10.00	1290.00
101-114	Brake cables	1	10.00	1	10.00	1300.00
101-115	Shift cables	1	10.00	1	10.00	1310.00
101-116	Brake pads	1	10.00	1	10.00	1320.00
101-117	Shifters	1	10.00	1	10.00	1330.00
101-118	Spacers	1	10.00	1	10.00	1340.00
101-119	Brake cables	1	10.00	1	10.00	1350.00
101-120	Shift cables	1	10.00	1	10.00	1360.00
101-121	Brake pads	1	10.00	1	10.00	1370.00
101-122	Shifters	1	10.00	1	10.00	1380.00
101-123	Spacers	1	10.00	1	10.00	1390.00
101-124	Brake cables	1	10.00	1	10.00	1400.00
101-125	Shift cables	1	10.00	1	10.00	1410.00
101-126	Brake pads	1	10.00	1	10.00	1420.00
101-127	Shifters	1	10.00	1	10.00	1430.00
101-128	Spacers	1	10.00	1	10.00	1440.00
101-129	Brake cables	1	10.00	1	10.00	1450.00
101-130	Shift cables	1	10.00	1	10.00	1460.00
101-131	Brake pads	1	10.00	1	10.00	1470.00
101-132	Shifters	1	10.00	1	10.00	1480.00
101-133	Spacers	1	10.00	1	10.00	1490.00
101-134	Brake cables	1	10.00	1	10.00	1500.00
101-135	Shift cables	1	10.00	1	10.00	1510.00
101-136	Brake pads	1	10.00	1	10.00	1520.00
101-137	Shifters	1	10.00	1	10.00	1530.00
101-138	Spacers	1	10.00	1	10.00	1540.00
101-139	Brake cables	1	10.00	1	10.00	1550.00
101-140	Shift cables	1	10.00	1	10.00	1560.00
101-141	Brake pads	1	10.00	1	10.00	1570.00
101-142	Shifters	1	10.00	1	10.00	1580.00
101-143	Spacers	1	10.00	1	10.00	1590.00
101-144	Brake cables	1	10.00	1	10.00	1600.00
101-145	Shift cables	1	10.00	1	10.00	1610.00
101-146	Brake pads	1	10.00	1	10.00	1620.00
101-147	Shifters	1	10.00	1	10.00	1630.00
101-148	Spacers	1	10.00	1	10.00	1640.00
101-149	Brake cables	1	10.00	1	10.00	1650.00
101-150	Shift cables	1	10.00	1	10.00	1660.00
101-151	Brake pads	1	10.00	1	10.00	1670.00
101-152	Shifters	1	10.00	1	10.00	1680.00
101-153	Spacers	1	10.00	1	10.00	1690.00
101-154	Brake cables	1	10.00	1	10.00	1700.00
101-155	Shift cables	1	10.00	1	10.00	1710.00
101-156	Brake pads	1	10.00	1	10.00	1720.00
101-157	Shifters	1	10.00	1	10.00	1730.00
101-158	Spacers	1	10.00	1	10.00	1740.00
101-159	Brake cables	1	10.00	1	10.00	1750.00
101-160	Shift cables	1	10.00	1	10.00	1760.00
101-161	Brake pads	1	10.00	1	10.00	1770.00
101-162	Shifters	1	10.00	1	10.00	1780.00
101-163	Spacers	1	10.00	1	10.00	1790.00
101-164	Brake cables	1	10.00	1	10.00	1800.00
101-165	Shift cables	1	10.00	1	10.00	1810.00
101-166	Brake pads	1	10.00	1	10.00	1820.00
101-167	Shifters	1	10.00	1	10.00	1830.00
101-168	Spacers	1	10.00	1	10.00	1840.00
101-169	Brake cables	1	10.00	1	10.00	1850.00
101-170	Shift cables	1	10.00	1	10.00	1860.00

public. Why hasn't Customs and Excise closed the Golden Computer Arcade? After all, Hong Kong's copyright infringement laws are some of the toothiest around. Under Section 5 of the copyright ordinance, copyright infringement is punishable by a prison term of up to two years and a fine of \$6,400. In addition, a wronged party can sue a pirate for damages.

In November 1987, at the behest of a group of software companies, Customs and Excise raided three warehouses and five retail hubs—including the Golden Computer Arcade. Ten people were arrested, and 28,506 manuals and 787 diskettes were seized. The retail value of the confiscated software was approximately \$38,500. Not until this month will investigators have identified all the software and manuals. Therein lies the rub: in order to prosecute, U.S. software publishers must go to Hong Kong and examine suspect manuals and diskettes. Complaining about software piracy is easy; doing something about it requires determination.

When informed by Customs and Excise that pirated copies of their software had been discovered among the November haul, some companies declined to prosecute. It wasn't worth the expense to many of them, especially those who don't do business in Hong Kong anyway. A smaller number see pirating as a way to establish a market foothold in Hong Kong; if they ever set up shop there, a user base will already exist. In some cases, manuals and diskettes not used as evidence for prosecution were returned to the vendors from whom they were seized.

K.S. Tong, deputy commissioner of Customs and Excise, would like to tarnish the Golden Computer Arcade, but he stresses that software companies have to be willing to stand up for their copyrights. He insists that Customs and Excise doesn't deserve all the blame for failing to control software piracy.

One key to curbing piracy lies in seiz-

ing the warehouses where the illegal software is stored. Since the past two raids, some wary hawkers at the Golden Computer Arcade have been displaying only manuals. Once you make your selection, they'll copy the software you want on the spot. The raids sent ripples through the piracy business, creating shortages of manuals as far away as Australia.

"You have to go after the chickens, not the eggs," Tong says. "If you arrest a hawker, another one will show up the next day. The suppliers are where we concentrate."

Those suppliers, not the hawkers like Jamie Wong, are the ones making the real money. Suen Man Tung, an alleged software piracy kingpin who was arrested in connection with the November raid, seems to have made lots of money from the piracy business. "We don't know exactly how much he made," says a U.S. software company representative. "But he made a lot. He has at least one late-model Mercedes." Suen and other alleged pirates haven't yet been charged with crimes, because customs is still sorting the



Legitimate PC software can cost well over twice as much in Hong Kong as it does in the U.S. Also, there isn't as much shareware available.

seized materials.

The Hong Kong government is anxious to save face and dispel the colony's growing reputation as the counterfeiting capital of the world. To that end, the Hong Kong Law Reform Commission created a copyright subcommittee to study ways to protect manufacturers. It expects to deliver a report in 1989 or 1990. "You look at the speed with which technology moves ahead," says David Fitzpatrick, a member of the subcommittee, "and you see how hard it is for legislation to keep up. We want to hear suggestions from everybody in the industry."

Competition in Hong Kong is cutthroat. Everybody plays hardball. Law enforcement officials there know that software piracy can never be eliminated, but they believe that it can be curbed.

"The rewards are there," one English observer says, "if American software companies choose to seek them." ■

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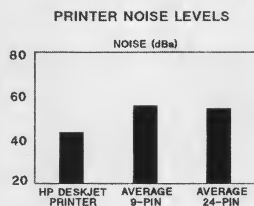


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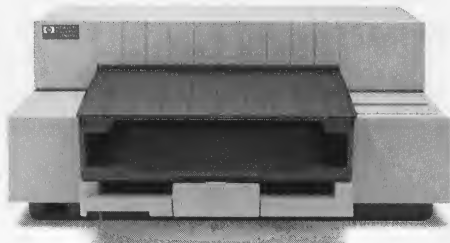
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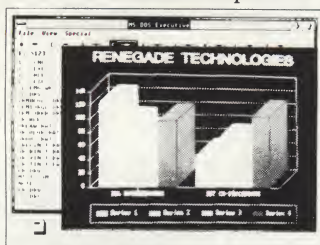
by Hauppauge Computer Works. Hauppauge is a major developer of software

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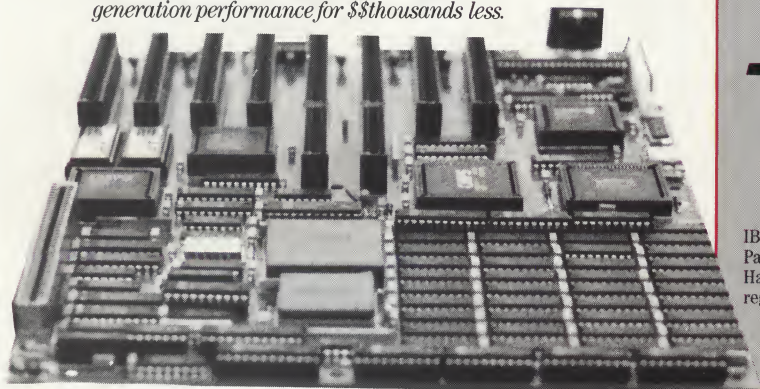
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Grammar Checkers:

prose & cons

Afraid of embarrassing grammatical errors and stylistic faux pas? Quoth the grammar maven, "Nevermore."

By PRESTON GRALLA

Do you live in fear of the Grammar Police? Have your spouse, your boss, and your rivals at work made you so self-conscious about your writing that you're afraid to put the simplest sentence into place? Do you lie awake half the night and force yourself out of bed early the next morning, knowing that when you arrive at the office you'll have to write a memo, a report, a piece of documentation, even a simple sales letter?

Well, if you can believe a group of software manufacturers, your troubles may soon be over. All you need is one of their grammar checkers or style analyzers. Such programs, say their makers, will help you to turn the deadliest of dull prose into crisp, clear writing. In no time you'll be churning out memo after memo, report after report, and winning praise not only for your quality of thought but for your clarity of expression as well.

Several such packages are on the market, and in general they work alike. Most analyze sentence, word, and paragraph lengths to gauge whether your writing is too complex. They may also assign a school grade level as a measure of reading difficulty. The packages usually contain dictionaries that enable them to point out commonly misused words. When the software comes across such a usage, it warns you of a possible problem. Some programs go further, offering suggestions to strengthen your writing.

Using computers to improve writing is nothing new. The idea was born at Bell Laboratories, where researchers trying to create better-written documentation developed a group of software utilities—later packaged and sold as Writer's Workbench—to run on minicomputers under the Unix operating system.

When personal computers came out, the idea was brought over to the world of smaller systems. Style and grammar checkers for PCs have never really caught on, however. Today such software still finds use mostly on larger computers—for example, in the writing of military manuals, which often must conform to certain reading-level requirements.

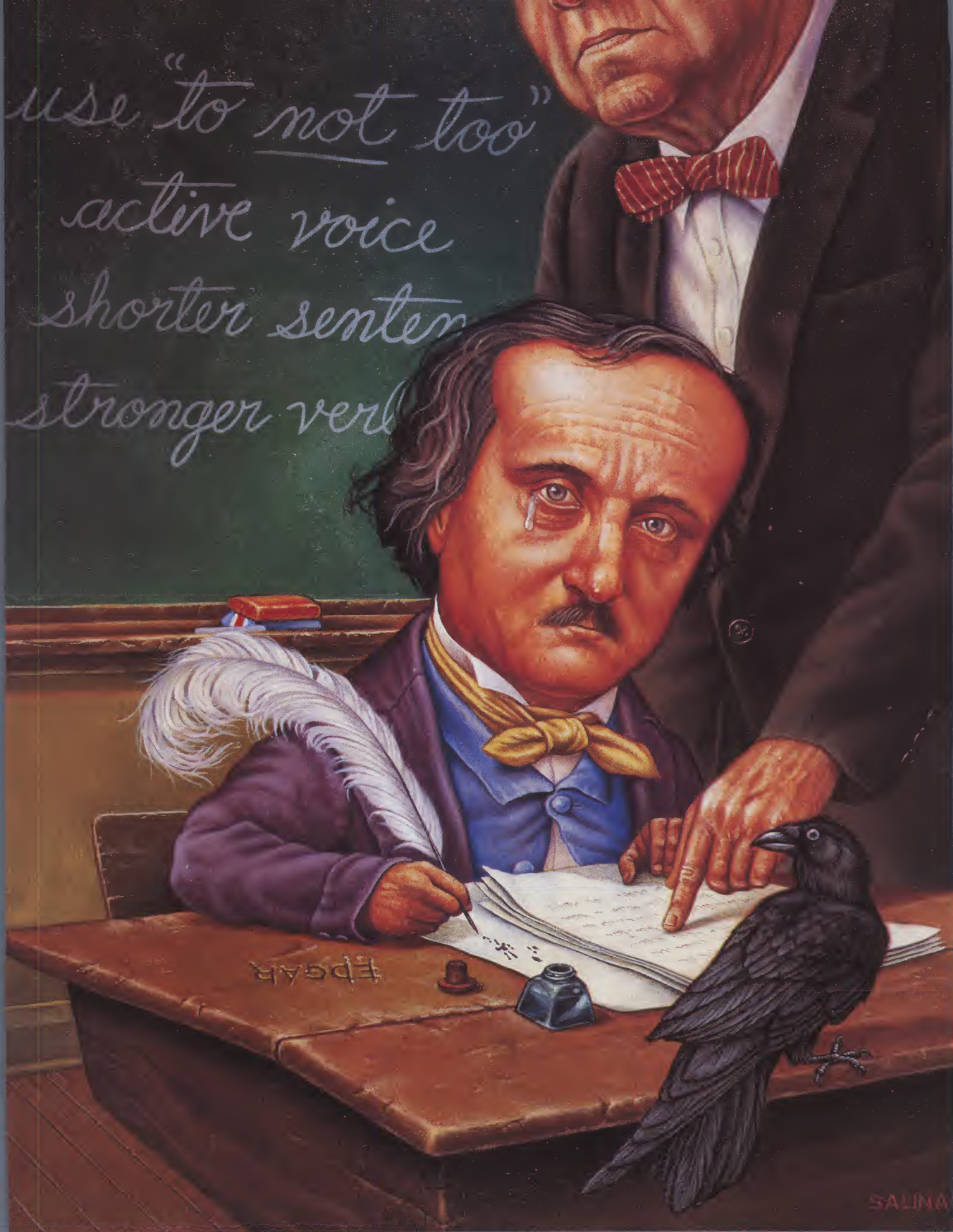
IBM has been noticeably absent from the field, but that may change. The company is developing a product called Critique, which differs from Writer's Workbench in that it checks for grammatical errors instead of simply assessing style and diction. Critique is being developed for mainframe computers and may eventually run on PS/2s and PC RTs.

The goal of these big-company, big-computer programs is to enforce uniformity on large writing projects, such as documentation and training systems. But the question remains: Are style and grammar checkers useful on PCs?

To a large degree, that depends on who you are. Professional writers avoid them because they reward prose that conforms to the lowest common denomi-

ILLUSTRATION BY JOSEPH SALINA

use "to not too"
active voice
shorter sentences
stronger verbs



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nator of sentence structure and length. But busy executives who are frightened of writing may find such programs helpful, if only because they demand rigorous attention to every word put down on a page.

To help you to decide whether a style or grammar checker can cure your writing afflictions, we selected four programs and put them through their paces. We fed them a variety of writing passages, from sales letters, internal memos, and software documentation to a chapter from a best-selling Jackie Collins novel.

We also asked each program to offer advice to one of America's greatest short-story writers, Edgar Allan Poe. We chose his chilling story "The Masque of the Red Death." The reviews were mixed; if poor Edgar had had any of these electronic nudges as an editor, he might have expired of drink and drugs even sooner than he did.

RightWriter

RightWriter, from RightSoft, Inc., takes a no-frills approach to grammar and style checking. After installation, simply type "Right" at the DOS prompt, followed by the name of the file to be checked. RightWriter then builds a dictionary containing every word used in the document, analyzes sentence and paragraph lengths, and gives you a brief on-screen summary of its findings.

The summary tells you the number of words in your piece and then offers four simple ratings. First is the readability index, which tells you the grade level required to understand your writing. A readability index of 7.59, for example, means that your work could be understood by someone with seventh-grade reading skills.

Next comes the strength index, which purports to measure the vigor of your writing. Its values range from 0.00 to 1.00; the higher the number, the stronger RightWriter deems your piece. If you've used lots of qualifiers, uncommon words, and complex sentences, the strength index will be low. The simpler the writing, the stronger the rating.

The descriptive index measures your use of adjectives and adverbs. When RightWriter detects writing with too few or too many modifiers, it suggests changes.

The jargon index, as its name implies, tells you whether you have used too much jargon.

RightWriter also marks up your writing in a separate file, flagging weak words, colloquial phrases, slang, punctuation that may be used inappropriately, and so on.

Finally, the program generates a critique of your writing, repeating the indexes and offering specific advice on how to strengthen your prose. It also generates a list of words that may be misspelled or misused.

Preston Gralla is a senior editor of PC/Computing.

With all this information and advice, how well does RightWriter accomplish its purpose? The answer, unfortunately, is not very well.

In checking an interoffice memo, for example, the program missed the use of the word *to* in place of *too*. Also, it failed to flag some incomplete sentences and to suggest changes for paragraphs that, because of tortured grammatical constructions, were thoroughly incomprehensible.

Worse yet, it gave this example of poor writing a strength index of 0.70—by the program's standards, a high rating. The chapter from the Jackie Collins novel rated a solid 0.67, though the program was deft enough to realize that only a third-grade education is needed to understand the best-seller.

Poor Mr. Poe didn't score nearly so well: on the strength index, his story rated a miserable 0.15. RightWriter had a number of suggestions for improving his dark prose, including this pert advice: "Writing can be made more direct by using: the active voice, shorter sentences, fewer weak phrases, more common words."

As if that weren't bad enough, RightWriter marked up Poe's story unmercifully with such comments as "Complex sentence . . . Long paragraph . . . Passive voice . . . Redundant . . . Wordy."

Obviously, this program is less than useful for experienced writers. And when it comes to specific suggestions for strengthening memos, it may fall short as well. But RightWriter is relentless in its quest to force people to simplify their writing, and for this purpose alone it may at times be helpful.

The newest version of RightWriter, Version 3.0, unavailable for review for this article, will check for a wider range of grammatical errors, according to its developers.

Readability

If you have an inferiority complex because you spend your life using words rather than numbers, and you're jealous of number-crunchers who quickly and easily create and manipulate important-looking, colorful graphs, then this may be the program for you.

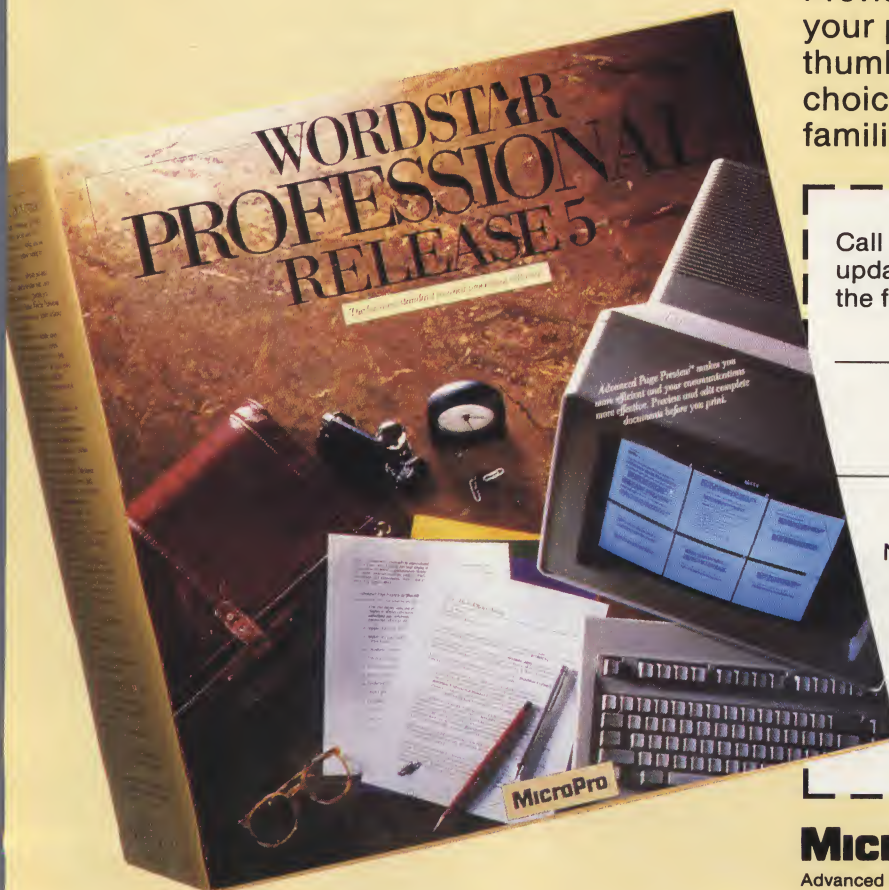
Readability takes a decidedly nonliterate approach to the analysis of writing. It treats words, sentences, and paragraphs as just so much raw data. From this information it builds more than a dozen eye-catching, entertaining charts and graphs.

After digesting your document, Readability creates its first and most arresting visual: it analyzes every sentence in your piece according to word and sentence length and plots the results on a graph. Then it compares this plot to one of nine "ideal" patterns of writing, ranging from fiction to magazine articles, from advertising copy to technical manuals. This ability to customize the analysis to the type of writing you want is one of the first attempts by a style checker to recognize that there are different types of writ-

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C:\SPCSREAD                      2 C:\PCC\OCT\POE.OUT                      I
||.....1.....2.....3.....4.....5.....6.....7.....||
  READABILITY INDEX: 9.49+
  Readers need a 9th grade level of education.+
  Total Number of Words in Document:2434+
  Total Number of Words within Sentences:2424+
  Total Number of Sentences: 188+
  Total Number of Syllables:3432+

  STRENGTH INDEX: 0.15+
  The writing can be made more direct by using:+
    - the active voice+
    - shorter sentences+
    - fewer weak phrases+
    - more common words+

  DESCRIPTIVE INDEX: 0.83+
  The use of adjectives and adverbs is in the normal range.+

  JARGON INDEX: 0.00+

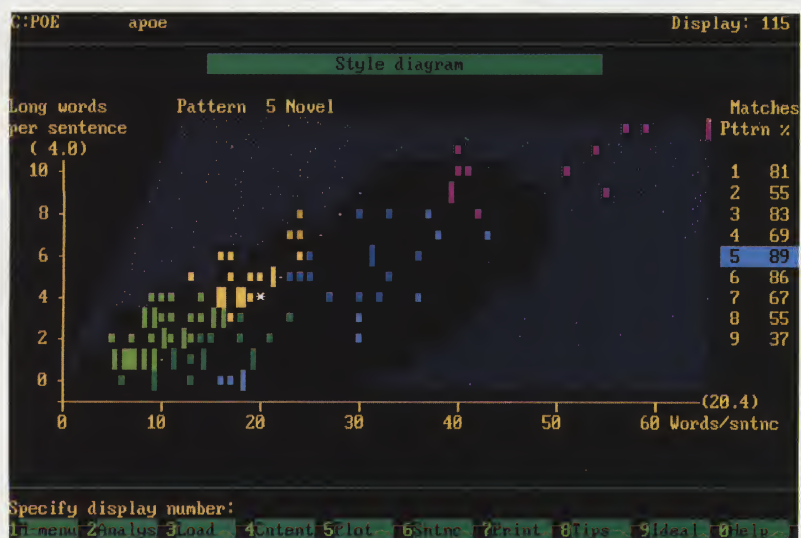
  SENTENCE STRUCTURE RECOMMENDATIONS:+
    1. Most sentences contain multiple clauses.+
    Try to use more simple sentences.+
    14. Consider using more predicate verbs.+

```

RightWriter

List Price: \$95.

RightSoft, Inc.
4545 Samuel St.
Sarasota, Fla. 34233
(813) 952-9211



Readability

List Price: \$59.95

Scandinavian PC
Systems, Inc.
51 Monroe St., Suite 707A
Rockville, Md. 20850
(301) 738-8826

ing and that they should be judged by different standards.

Subsequent screen displays are just as pleasing to the eye—even hypnotic. Perhaps there is a way, at last, to analyze writing scientifically, a magic numerology that will finally turn you into a good writer. Graphs that tally sentence types, the number of long words per sentence, and the number of consecutive short words are displayed with captivating ease. The program culminates in an overall evaluation that includes graphs and text and offers a number of pseudoscientific measurements of your writing, including “displacement,” “spread,” “compliance,” and “focal point distance.”

Nevertheless, all this wealth of data, presented so

pleasingly, may not help you write better. The program doesn’t address content and grammar, and its suggestions on improving one’s writing are often meager.

Readability did, at least, recognize that our estimable Mr. Poe knew how to wield a pen, though it expressed its commendation rather strangely. And the program itself suffers from a common stylistic failing: too many exclamation points! “Text’s focal point is very favorably located,” it comments. “Text has a broad spread on the Style diagram. Very Good! There are no complicated sentences in the text. Simple and easy to read!”

And even as it suggests ways to improve one’s writing, the program makes grammatical mistakes.

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**Requires proper adapter card*



PSM-03

PSC-28

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For example:

"You can improve text's readability by:

"— write even more sentences containing only short words.

"— use even more simple, ordinary words."

The program also misspells *choice* as *choise* on one of its data screens.

Despite its flaws, Readability may be of some use, if numbers, charts, graphs, and colors can prod you into thinking about your writing objectively.

Electric Webster

Of the four programs tested here, this one fared by far the worst. That's not a surprise, since it's a hold-

over from the days when word processors didn't have built-in spelling checkers and hyphenation programs. Electric Webster checks for spelling and hyphenates words if you so choose, but at times it seems as if its grammar checker were an afterthought.

In fact, the program may be more of a nuisance than a benefit. Electric Webster flags words as incorrect without regard to their context. For instance, it points out every use of the word *your*, because perhaps you really meant *you're*. The program is not intelligent enough to distinguish between the two words, so you must decide which is correct.

Electric Webster follows the same dogged procedure for many other word pairs and grammatical

CorrectText

English teachers and professional writers may pooh-poooh the current crop of grammar checkers and style analyzers, but even they may have to stand up and take notice of an electronic proofreader created by Houghton Mifflin of Boston.

This venerable publishing company, well known for reference books such as the *American Heritage Dictionary* and *Roget's Thesaurus*, is marketing what it calls the CorrectText Grammar Correction System. CorrectText differs from other grammar checkers in one important respect: rather than analyze a writer's style, it points out grammatical errors, much as a spelling checker uncovers misspellings.

Other grammar checkers claim to do this, but rarely do they do it so well. That's because only CorrectText uses artificial intelligence to break down each sentence of a document into its component parts and make sure they all fit properly. The program flags disagreements between subjects and verbs, finds typographical errors, knows the difference between *who* and *whom* as well as any editor does, flags incorrect uses of adjectives and adverbs, and points out split infinitives. In short, using CorrectText is a bit like having Edwin Newman look over your shoulder as you write.

Running CorrectText is simplicity

itself. After loading it, you go through whatever document you want to check, and the program stops at every error it detects and offers advice. For example, it says, "Consider 'are' instead of 'is' " when it finds a sentence whose subject and verb do not agree.

You are free, of course, either to correct the error as the program suggests or to go on to the next problem. But CorrectText is a stickler for detail: if you make a change and your usage is still incorrect, it will tell you so.

Unfortunately, Houghton Mifflin is not selling CorrectText directly to the public. Rather, it's trying to license the package to hardware and software vendors, which can either bundle it with their own software or sell it by itself under different names.

Not only does CorrectText differentiate between incorrect and proper usage, it also truly parses sentences. In contrast, most grammar programs merely compare phrases in your writing against their internal dictionaries. For example, while some programs flag every use of *their* and *they're*—whether or not they're used incorrectly—and warn you that you might have made an error, CorrectText flags those words only when they are, in fact, used improperly.

All this power comes at a price.

First of all, the program takes approximately one second to check each sentence. This is fast enough for short memos, but for long documents or manuals it may be too time-consuming.

A bigger problem is that CorrectText is a memory hog. With its sizable dictionary and extensive knowledge of the rules of grammar, it takes up 640K.

That might not sound like much, but for this kind of application to be truly useful, you should be able to call it directly from a word processor, much as you do with an online spelling checker or thesaurus. It's unlikely that many people will be willing to exit their word processors, load CorrectText, check their documents for grammatical errors, exit the program, and reload their word processors when they want to get on with their writing.

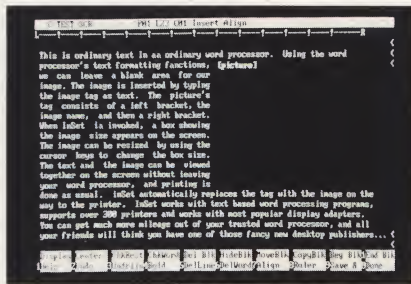
Possibly because of this, no PC software maker has yet signed up to sell CorrectText. And only one computer company has bought a license to use it: the Digital Equipment Corporation of Maynard, Massachusetts. Digital is selling the software for its Vax line of minicomputers under the name Vax Grammar Checker.

Unless you write on a Vax, you'll have to wait for CorrectText. Until then, keep your Strunk and White handy. —PG

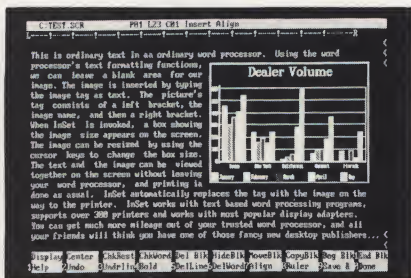
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by Edgar Allan Poe
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been so fatal, or so hideous. Blood was its Avatar and its seal -- the
redness and the horror of blood. There

PHRASE: its-->HOMONYM OR SIMILAR WORD
SUGGEST: it's, its=possessive of it
RESPONSE:

***** SELECT APPROPRIATE RESPONSE *****

* Press "C" to CORRECT	* Press <RET> to Leave "AS IS"
* "<" or ">" to Expand Phrase	* "O" to OMIT phrase
* "M" to MARK Text	* "S" to SKIP Phrase Hereafter
* "R" to REPLACE w/ Suggestion	* "E" to ELIMINATE Category
* "X" to EXIT Grammatical Checking	

Electric Webster

List Price: \$129.95

Cornucopia Software, Inc.
P.O. Box 6111
Albany, Calif. 94706
(800) 343-2432
(415) 528-7000

Marking Options Phrases Quit
F1-Help

by Edgar Allan Poe
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been so fatal, or so hideous. Blood was its Avatar and its seal -- the
redness and the horror of blood. There were sharp pains, and sudden
dizziness, and then profuse bleeding at the pores, with dissolution. The
scarlet stains upon the body and especially upon the face of the victim,
were the pest ban which shut him out from the aid and from the sympathy
of his fellow-men.

Check: The scarlet stains upon the body and especially upon the face of
the victim , were the pest ban which shut him out from the aid
Problem: Long sentence
Advice: Long sentences can be difficult to read and understand. Consider
revising.

F10 - Next problem F8 - Mark problem F6 - Ignore error type from now on
F9 - Edit problem

Grammatik III

List Price: \$99.

Reference Software, Inc.
330 Townsend St., Suite 123
San Francisco, Calif. 94107
(800) 872-9933
(415) 541-0222

constructions. As a result, it soon becomes tedious.

The program generates a summary of data about the piece being checked but offers no way of gauging whether the writing is good or bad. It tells you the average word length, sentence length, and paragraph length but makes no comment on what these numbers reveal about your writing.

To top it off, Electric Webster gives you an overall readability score without explaining what it means. And for some reason, it didn't rate Poe at all.

Grammatik III

This program is, in a way, the most maddening of the four. At times it provides brief glimpses of what a really good grammar checker should do. At other

times, however, it falls far short of its potential.

Grammatik III is the only program reviewed here that parses sentences—that is, breaks them down into their grammatical parts and tells you whether they agree. It includes an expert-system-like facility to do this, and at times it works extremely well.

The program will, for example, point out when the subject and the verb of a sentence do not agree. It's also sophisticated enough to know that *there delivery* should read *their delivery*.

Additionally, Grammatik III will flag *at this point in time* as wordy, and it is savvy enough to tell you that two exclamation points in a row should be avoided at all costs.

It also allows a degree of customization: while it's

Writer's Workbench

▶ The granddaddy of style checkers was born not on the humble PC but on more powerful minicomputers.

Unix Writer's Workbench was developed at Bell Laboratories as part of a research effort to improve documentation there. What began as an internal effort was soon seen to have wider appeal, and the company decided to sell the group of programs to outsiders.

Writer's Workbench is not a single program but a series of proof-reading and language-analysis tools that can be run individually or together. Many of them will look familiar to those accustomed to PC word processors and style checkers: a spelling and punctuation program, a style analyzer, and so on.

Writer's Workbench goes well beyond what can be found on today's PCs, however. It includes, for example, a program called Org that can help you to examine the structure of your writing. Org shows the first and last sentence of every para-

graph in a document, in essence creating an outline. It can also tell you whether each paragraph in your writing has a beginning and a conclusion.

Particularly helpful is the fact that Writer's Workbench can be customized for various styles of writing. What it flags when it's checking a technical manual will differ from what it finds in an in-house memorandum.

These and other features make Writer's Workbench far superior to similar PC software, according to Charles Smith, a professor of English at Colorado State University. In concert with Bell Laboratories, he developed a collegiate version of the package. Smith uses the program in his composition classes to teach his students the elements of good writing.

"Writer's Workbench runs on a minicomputer, and so it has more resources available," Smith says. "It begins with more information about the text."

Smith feels that the overall quality of his students' writing has improved since they started using Writer's Workbench. In addition, he says, they make fewer typographical errors and other minor mistakes, allowing him to concentrate more on content when reviewing their writing.

Smith's classes have also served as laboratories sites for Critique, a grammar checker currently under development at IBM. The program is superior to Writer's Workbench for teaching grammar and punctuation, Smith says, but it is not as good at addressing broader issues of style and organization.

Critique currently runs only on mainframe computers. Smith says that if the package becomes available for use on smaller machines, he may use it in his classes.

But the professor will never give up Writer's Workbench. "If they took away my Workbench today," he says, tongue only half in cheek, "I'd quit." —PG

checking your writing, you can tell it to stop calling attention to certain stylistic or grammatical constructions.

Grammatik III still lacks a good deal of grammatical knowledge, however, and at times it's as annoying as Electric Webster. For example, it flags every use of gender-specific words, such as *he*, *she*, *her*, and *his*. The goal—the elimination of so-called sexist words—may be admirable, but Grammatik III pursues it to an absurd extreme. When it encounters *He walked down the street*, it advises, "It is possible to revise and avoid using *he*. Use of *they* is now considered acceptable."

In evaluating our writing samples, Grammatik III made a number of other gaffes, including saying that some complete sentences were incomplete. It also had difficulty with some verbs and pronouns, saying about *he glanced*, for example, "You may mean the possessive form of the pronoun, or need a comma or a verb."

Like the other programs reviewed here, Grammatik III disliked Poe's long sentences and recommended shortening them at every opportunity.

Grammatik III also generates a summary of your

writing, with statistics about word, sentence, and paragraph length, and offers various readability ratings. The program choked on "The Masque of the Red Death" but digested Jackie Collins's fiction quite well, awarding it a significantly higher "reading ease" score and a far lower "Fog" index than it gave Poe's piece.

Like the other programs reviewed here, Grammatik III is most useful if you need general guidance on simplifying your writing. When it gets down to more specific advice about grammar and usage, it gets into trouble.

Sink or Swim

Whether you find any of these packages useful will depend on how good a writer you are and whether you're willing to accept advice from a computer. In any case, keep in mind F. Scott Fitzgerald's words on putting pen to paper (or finger to keyboard): "All good writing is swimming under water and holding your breath."

The best advice we can offer is to close your eyes, take a deep breath, pinch your nose, and jump right in. ■

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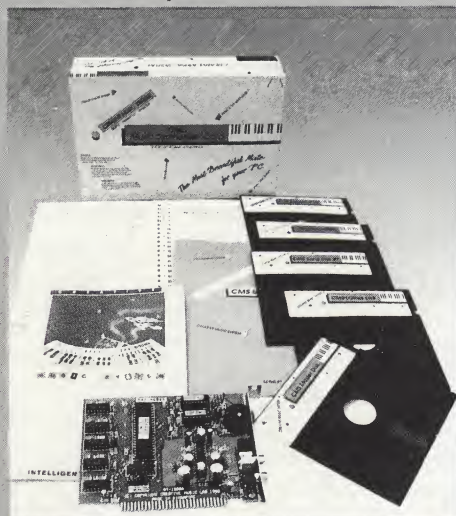
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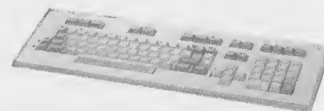
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The Right Touch: Classic Keyboards

**Four ways to put PC power
at your fingertips.**

By WINN L. ROSCH

and DONALD P. WILLMOTT

Judging by how much they look alike, you might never suspect that personal computer keyboards have idiosyncrasies that can change not only how well you type but how you feel about using your computer. But switch keyboards, and suddenly a new world opens to you.

There is no such thing as the perfect keyboard. Still, led by IBM, keyboard manufacturers continually redesign their products as if there were. Ironically, IBM's own record is mixed: the company has always built excellent keyboards, yet they have received plenty of criticism.

You Can't Please Everybody

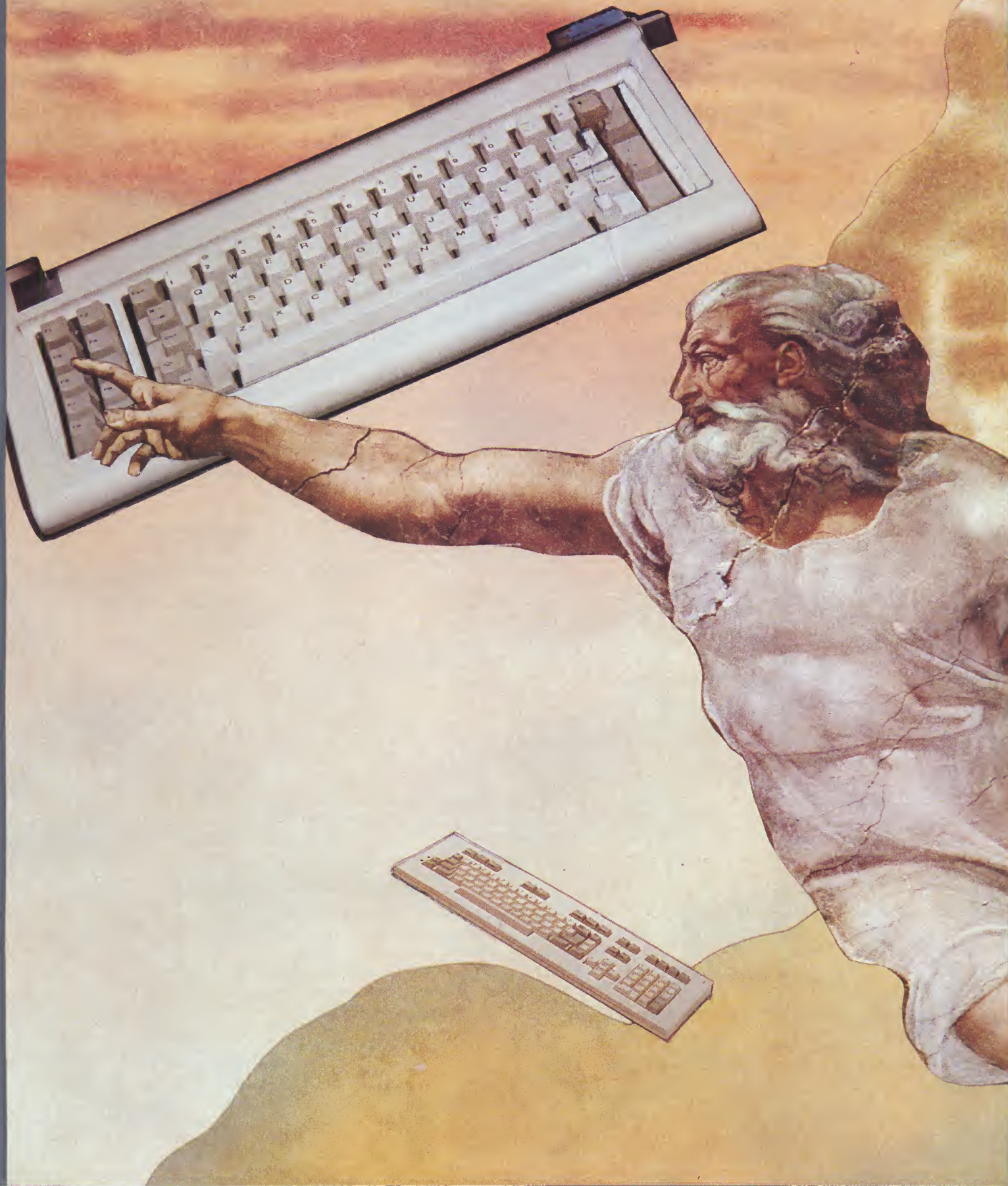
It all started with the first PC keyboard, a product of undoubted compromise. Cobbled together from off-the-shelf parts (allegedly from an early, none-too-successful dedicated word processor, an ancestor of

the DisplayWriter line), it was rushed into production simply to get an untested concept—the first IBM PC—out the door.

A reasonably well thought-out creation, the PC keyboard was received, by a world still new to computing, as a devious implement of torture worked out by a design team recruited from the Borgia heirs. According to the critics, several of the keys were in odd places; many had strange arrows instead of familiar characters; the Enter key was small and hard to find; one pad did double duty, both moving the cursor and adding numbers; and the function keys were arranged vertically, while most programs labeled them on the screen horizontally. Everyone—or at least the noisiest faction of these faultfinders—longed for the venerated keyboard of IBM's own Selectric typewriter.

Those complaining the loudest were computer

ILLUSTRATION BY CAROL WALD



journalists—who, like most writers and other ne'er-do-wells, had grown up with Selectrics, not computers. They wanted their familiar old typewriters. But the PC keyboard was designed for programmers, not just wordsmiths.

Moreover, the PC keyboard was a big advance over the Selectric in consistency and feel. It required lighter pressure to actuate its keys, and the resistance of the keys was consistent—a uniformity the Selectric lacked.

IBM listened to the complainers and created a new keyboard for the PC AT. Indicator lights for three

The PC keyboard was received, by a world still new to computing, as a devious implement of torture worked out by a design team recruited from the Borgia heirs.

toggling keys (CapsLock, NumLock, and ScrollLock) were added. Most of the odd, programming-oriented keys were moved to less obnoxious positions. And, miracle of miracles, the Shift and Enter keys grew to their Selectric dimensions.

The result? The critics still complained, mostly about the left-hand function keys and the lack of a dedicated cursor keypad. In typical shortsighted fashion, they blasted the faults they perceived without thinking of the consequences of fixing them.

Again, IBM listened, then gave the world the Enhanced keyboard. Resembling a hollowed-out surfboard with keys on top, the Enhanced design moved the ten function keys to the top row, where they spawned two offspring. A separate cursor keypad was added. And, for no apparent reason, IBM redesigned the Enter key again and reshuffled the layout of the Alt, Shift, Ctrl, and CapsLock keys.

The result was a bigger keyboard, with harder-to-use function keys and a ridiculously misplaced Ctrl key. The Enhanced design is worse to type on than the AT keyboard. It is essentially designed for low-speed klutzes and hunt-and-peckers. The AT keyboard is vastly superior for fast, accurate typing.

The critics, now humbled, refrain from raising a pean to the former AT design or complaining about the Enhanced layout. As a result, the Enhanced design reigns at IBM and compatible computer compa-

nies. The only relief you'll find is the refreshing Northgate OmniKey keyboard layout (see review).

More Than Meets the Eye

Keyboard differences go deeper than their keytops, however. While most users think that the technology that makes the keys work is a minor concern, in truth the underlying mechanism affects the feel of a keyboard, how quickly you can type on it, how many errors you will make, and how long it will last. Matching the mechanism to you and your fingers is one of the most important aspects of finding the right design.

Today's standard is capacitive technology, which uses the proximity of two charged plates to trigger circuitry that detects key movement. Proven and long-lived, capacitive technology is the heart of most modern keyboards. The major contender is the hard contact, which mates metal to metal as in a light switch. Although this design is simpler than the capacitive mechanism, the life span of keyboards with hard contact keys is generally somewhat shorter.

From the typist's view—and feel—these technologies would be the same, save for the refinements manufacturers add. For instance, the IBM keyboard has more springs than a bazaar full of crooked scales, giving a distinctive feel called "tactile feedback." You press down against increasing resistance, and when the keystroke is made, the resistance suddenly lightens, so your fingers know they've done their work. The IBM mechanism also emits a sharp click, so your ears know the job is done. The onscreen appearance of a character is the third confirmation.

Other manufacturers think differently about keyboard feel. Key Tronic is famed for its light touch. Its spring-driven tactile feedback is not nearly as sharp as IBM's, and its keystrokes are silent.

Other companies such as DataDesk have taken to using rubber domes instead of springs to get a slightly different snap-over feel without a disturbing click. Of course, some people prefer the click, so a few keyboard manufacturers have added speakers inside their products to create a similar clatter.

The four keyboards examined on the following pages offer noteworthy alternatives. IBM's Enhanced keyboard is the standard, a good choice if you peck your way through the day, but a frustration if you have the slightest feel for touch-typing. Northgate tries to combine the best of the AT design, the Enhanced keyboard, and the Selectric layout; the result is astonishingly successful, with a Taiwanese mechanism that simulates the IBM sound and feel. Key Tronic gives you the light, quiet touch, perfect for penning poetry in a dark garret without disturbing the rest of the household. DataDesk runs the middle ground.

Find the one that suits you best, and your typing and temper may miraculously improve. —WLR

Winn L. Rosch is a contributing editor of PC/Computing. Donald P. Willmott is an associate editor of PC Magazine.

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IBM Enhanced Keyboard

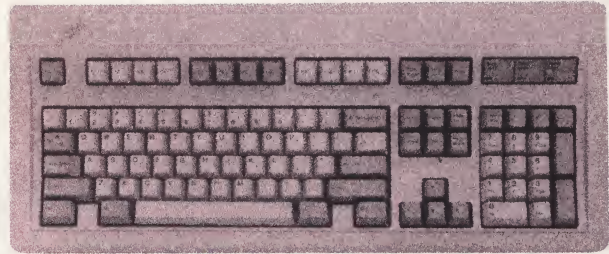
The wonderful touch of the IBM keyboard is the standard against which every other keyboard is invariably judged—usually unfavorably.

Introduced in 1986, IBM's 101-key Enhanced keyboard developed legions of advocates and equal numbers of detractors. Both camps are justified.

The liberation of the cursor keys from the numeric keypad is a definite improvement, especially when using software that has pull-down menus and would rather be directed by a mouse. The addition of standalone Insert, Delete, Home, End, Page Up, Page Down, and Print Screen keys is also welcome.

Not nearly so agreeable are the top row of function keys, the scrambled positioning of the Ctrl, Alt, and CapsLock keys, and the shrunken Enter key. These changes, combined with the rather steep slope of the keyboard, which raises the top tier of keys a little too far above the bottom tier for a comfortable reach, make the Enhanced keyboard more conducive to two-fingered point-and-shoot pecking than to smooth, full-throttle typing. Sadly, most clone keyboard makers, understanding that IBM sets the standards and makes the rules, have slavishly followed IBM's redesign.

What no other manufacturer has been able to do, however, is match the Big Blue feel. The IBM keyboard is famous for its responsive metallic click—the aural and tactile feedback that lets you know when your keystroke has been made, so your fingers don't waste time and energy pushing down more than they have to. This springy key response is best appreciat-



The IBM Enhanced keyboard liberated the cursor keys from the numeric keypad and added standalone Insert, Delete, Home, End, Page Up, Page Down, and Print Screen keys—welcome improvements.

ed by anyone who has been stuck with a soggy keyboard and has never had the chance to experience what real tactile feedback can do for typing speed.

Waves of relief washed over those who had eagerly awaited, but also feared, the introduction of IBM's new PS/2 line, after rumors circulated that IBM would create yet another keyboard standard. Fortunately, the entire PS/2 line has the same 101-key Enhanced keyboard.

One of the sad realities of personal computing is that the only way to get the touch of an IBM keyboard is to buy an IBM computer, but some people gladly pay the price. To find the name of your nearest authorized IBM dealer, call (800) 426-2468.

—Donald P. Willmott

Northgate OmniKey/102

Minnesota-based Northgate Computer Systems has found keyboard success with its \$99 OmniKey/102 by trying to make it all things to all people.

Although the OmniKey is as big as the IBM Enhanced keyboard and has as many keys (one more, in fact), PC old-timers will be delighted to discover that its 12 function keys have come home to the left edge of the keyboard. F1 through F10 are back in line with the five rows of the main section, and F11 and F12



Northgate's OmniKey/102 has brought the 12 function keys home to the left edge of the keyboard.

are perched above in an otherwise empty row, where other 101-key keyboards put the function keys.

The Ctrl key is next to A once again and inscribed in red (another Ctrl key sits in the lower right corner of the main section). The green-labeled Shift key is below Ctrl, and the blue-inscribed Alt key is below that. If this color scheme seems familiar, that's because it matches WordPerfect's key-color coding. The Esc key is at the upper left, adjacent to the numeral 1.

In the empty row where the function keys would normally be, Northgate has left room to insert a function key template. Another neat trick: by making the right Shift key smaller, Northgate has room to put the backslash key next to it. The result is one of the few keyboards around with both a large Backspace key and a large, L-shaped Enter key.

For its numeric keypad, Northgate has halved the size of the normally elongated plus key and added another equals sign key, so fast calculations aren't

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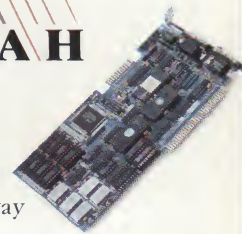
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CIRCLE NO. 199 ON READER SERVICE CARD.

interrupted by detours to find the equals sign key in the top row of the main keypad.

The feel of the OmniKey/102 is as close as you're going to get to the IBM standard without having the real thing. Like IBM, Northgate uses electromechanical contacts that give a distinctive click when the key has traveled halfway down its path. Though the keys seem more wobbly in their sockets than IBM's do,

the touch is excellent overall. Could this be? A keyboard without trade-offs?

The Northgate OmniKey/102 can be made PS/2 compatible with an optional \$25 upgrade, and the company offers a three-year warranty on its keyboards. Contact Northgate Computer Systems, 13895 Industrial Park Blvd., Suite 110, Plymouth, Minn. 55441, (800) 453-1400. —DPW

Whence Qwerty?

Legend has it that the Qwerty keyboard arrangement—that strange ordering of characters you find on virtually every typewriter and PC—was deliberately designed to be difficult to use. The idea was to slow down typists who were outracing the capabilities of the first typewriters.

But according to motor-skills researcher Donald Gentner, Ph.D., formerly a specialist at the University of California at San Diego's Center for Human Information Processing, the legend is doubtful at best. Gentner finds nothing to substantiate it in the records of Christopher Sholes, the inventor of the typewriter. Moreover, he finds it doesn't stand up to logical scrutiny.

According to the legend, Sholes invented the typewriter for its print quality rather than for its speed. However, the first people to lay their fingers on it soon reached such high speeds (speeds, by the way, that wouldn't get them into a modern secretarial school) that they actually outran the abilities of the primitive mechanism, which had more levers and whatchamacallits squeezed into it than bones in a sardine can.

To prevent the type bars from jamming, the story goes, Sholes moved the keys into a less facile arrangement. And because so many people learned to type with the new layout, it became the industry standard—long outliving its original purpose, especially as the typewriter became more sophisticated.

"It's definitely a popular story," says Gentner, "but there are a num-

ber of real problems in it. I've never been able to find [this rationale for Qwerty] in original documentation, and I've looked back even into the original correspondence of Christopher Sholes."

It is true that Sholes's first typewriter patents showed alphabetic keyboards. And Gentner discovered a letter written by Sholes acknowledging the unusual key arrangement that he ultimately chose. But the letter does not explain *why* he changed the layout.

The idea that Sholes developed Qwerty to separate frequently occurring letter pairs doesn't hold up either, according to Gentner. "You see something like T-H on the keyboard very close together, and that's the most frequent letter pair. I've checked all of the about 800 letter pairs that occur in English and plotted them out, and there's absolutely no correlation." Furthermore, letters that are typed with alternating hands tend to be typed *faster*—exactly the principle behind the Dvorak keyboard, whose layout is said

The Qwerty keyboard appeared on the first commercial typewriter.



to improve typing speed dramatically. Moving keys farther apart makes them more likely to be typed by separate hands and, therefore, faster.

"The third problem," says Gentner, "is that all these arguments make sense only if you look at the manual typewriters that have been in fashion for the last 50 years or so. The Qwerty arrangement, however, came out on the first commercial typewriter, the Remington Model 1, which is substantially different from more recent machines. The Model 1 didn't have a semicircular arrangement of type bars; it had a circular arrangement. So two keys that are adjacent on the keyboard connect to type bars that are on the opposite sides of the circle in the Model 1. The result is that keys that are right next to each other turn out to have their type bars 180 degrees apart. People overlook the fact that there's no relationship between the arrangement of the keys and that of the type bars."

Finally, displacing certain keys to slow down typists would make sense only for touch-typing, but that technique didn't appear until 1888, when Qwerty was about 20 years old. The original users of Qwerty were clearly hunt-and-peck typists. Whether *any* keyboard layout would slow down hunt-and-peckers is open to speculation.

"I would love to find out more about the story," says Gentner. "I think there may be some truth to it, but it's one of those stories that have lives of their own, independent of any substantial factual basis."

—WLR

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RightWriter 3.0 helps you produce clear, powerful business writing. Not a spelling checker—RightWriter is a sophisticated expert system for checking errors in grammar, style, usage and punctuation.

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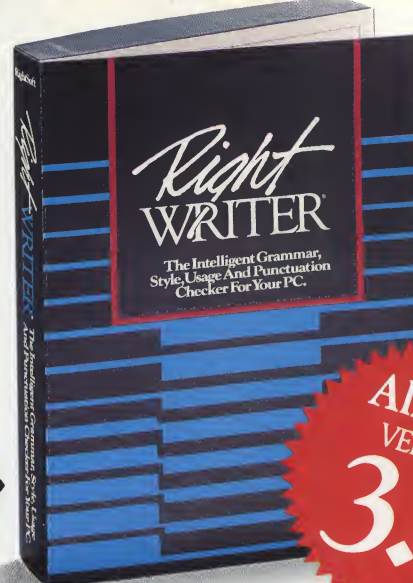
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The Original Text...

There is a problem of a severe nature in widget production. It is clear that our current system will not cut the mustard. We may possibly need to move on this reasonably quickly. To start, it would be advantageous to see if a new design is doable. (This should be looked into at once.

...RightWriter's Analysis

```
<<* U12. WORDY. REPLACE problem of a severe nature BY severe problem *>>
<<* S14. CONSIDER OMITTING: It is clear that *>>
our current system will not cut the mustard. We may possibly need to move on
<<* S16. CLICHE: cut the mustard *>>
<<* U13. REDUNDANT. REPLACE may possibly BY may *>>
this reasonably quickly. <<* S17. WEAK: reasonably quickly *>>
<<* S13. REPLACE advantageous BY SIMPLER helpful or good? *>>
design is doable. (This should be looked into at once.
<<* U16. NOT A WORD. REPLACE doable BY can be done *>>
<<* P11. IS THIS PARENTHESIS CLOSED? *>>
<<* S1. PASSIVE VOICE: be looked *>>
```

<< SUMMARY >>

Overall critique for: C:\RIGHT30A\newtest.
Output document name: C:\RIGHT30A\newtest.

READABILITY INDEX: 5.23

14th	12th	10th	8th	6th	4th
****	****	****	****	****	****
COMPLEX			SIMPLE		
Readers need a 5th grade level of education.					

STRENGTH INDEX: 0.78

0.0	0.5	1.0
****	****	****
WEAK		
The strength of delivery is good, but can be improved.		

DESCRIPTIVE INDEX: 0.27

0.2	0.5	1.0	1.2
****	****	****	****
TERSE		OVER DESCRIPTIVE	
The use of adjectives and adverbs is in the normal range.			

JARGON INDEX: 0.00

SENTENCE STRUCTURE RECOMMENDATIONS:

2. Few compound sentences or subordinate clauses are being used.
14. Many prepositional phrases are used.

<< WORDS TO REVIEW >>

Review this list for negative words (N), jargon (J), colloquial words (C), misused words (M), misspellings (?), or words which your reader may not understand (?).

ADVANTAGEOUS(J)	1	DOABLE(J)	1
NOT(N)	1	SEVERE(N)	1
WIDGET(?)	1		

<< END OF WORDS TO REVIEW LIST >>

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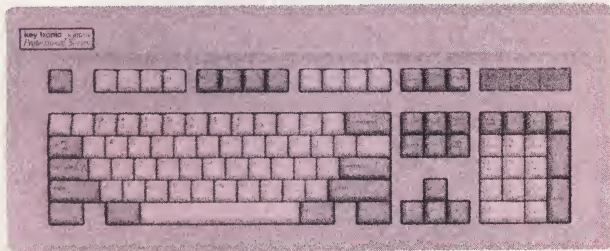
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CIRCLE NO. 282 ON READER SERVICE CARD.

Key Tronic KB 101-1

If the IBM Enhanced keyboard is a gently sloping ridge, then the \$139 Key Tronic KB 101-1 is a wide plateau, with lots of plastic around the edges. A faithful copy of the IBM standard, the Key Tronic KB



To ensure compatibility with the earlier-model PCs, the Key Tronic KB 101-1 has a set of dip switches on its underside to tell it which PC you are using.

101-1 has the layout right but feels significantly different because its keys have less spring than IBM's or Northgate's.

The KB 101-1's touch is somewhat looser as a result, and typing on it is more work because the keys have to travel deeper into their sockets to connect.

DataDesk Turbo-101 Enhanced Keyboard

DataDesk's \$149.95 Turbo-101 Enhanced Keyboard is similar to the Key Tronic KB 101-1: a rubber-domed, switch-equipped IBM Enhanced keyboard look-alike.

Like IBM, DataDesk puts the CapsLock key next to A, the left Shift key next to Z, and the Ctrl keys at the bottom corners of the central keypad. Unlike IBM, however, DataDesk allows you to change this layout. Simply flip a switch on the underside of the keyboard and the roles of the CapsLock and Ctrl keys are reversed; replacement keycaps are included to complete the conversion. It's a nice solution, about halfway toward Northgate's better answer of simply putting the keys back in their original positions.

By using a small Backspace key, DataDesk left room in the top row for the backslash key, making it possible to include a large Enter key. When you compare keyboards, the shape and size of the Backspace, Enter, and right Shift trio may be your most important layout consideration. It is in this neighborhood that keyboard designers do their most original work, and you should decide what kind of configuration allows you to do your fastest typing.

The feel of the Turbo-101 is nearly identical to that of the Key Tronic keyboard. Rubber-dome technology makes for long key travel, and users who

There is no click to tell your finger when a key has arrived; you know you're there only when you hit bottom.

Unlike the Northgate keyboard, the KB 101-1 has a small Enter key, not the fatter, backward-L-shaped Enter key found on most 101-key keyboards and even on some 84-key models such as those from Maxi-Switch. The positive trade-off: a larger right Shift key.

To ensure compatibility with earlier-model PCs, the KB 101-1 has a set of dip switches on its underside to tell it what kind of PC you are using. The keyboard can then behave accordingly. (IBM's own Enhanced keyboard is *not* compatible with earlier IBM PCs; it is precisely those millions of PCs and older XT's out there that alternative keyboard companies are targeting.)

Key Tronic keyboards come with a catalog of optional accessories for the well-dressed keyboard: a variety of dust covers, keyboard drawers, and templates for popular applications, including Lotus 1-2-3 and WordPerfect. The KB 101-1 has a three-year warranty. Contact the Key Tronic Corporation, Box 14687, Spokane, Wash. 99214, (509) 928-8000.

—DPW



The DataDesk Turbo-101 Enhanced Keyboard has room in the top row for a backslash key.

are accustomed to the click of the IBM may find that the missing confirmation of their keystrokes trips them up until they become familiar with the quieter operation.

Nevertheless, the Turbo-101 is far superior to the majority of the nameless mashed-potato keyboards that come connected to equally anonymous low-cost PC clones.

In order to win the largest possible number of customers, DataDesk has adapters available for AT&T, IBM PCjr, Compaq Portable, and IBM PC Portable machines. The Turbo-101 comes with a two-year warranty, and the package includes your choice of Borland's Turbo Lightning online spelling checker and thesaurus or the SuperKey macro program. Contact DataDesk International, 7651 Haskell Ave., Van Nuys, Calif. 91406, (800) 826-5398, (800) 592-9602 in California, or (818) 780-1673.

—DPW

WordPerfect 5.0 Users...Choose Sides

WORDPERFECT 5.0 DISPLAYS MULTIPLE

These Characters Are Shown

Boldface and underline look fine, but

Does your Italics look like this

Before, you couldn't tell whether

An outline font is good for titles,

It is important to be able to tell

And Small caps and double underline

Redline is designed to

When you want to display different

YOU USED TO HAVE TO GUESS, BUT

Without RamFont

FONTS USING HERCULES RAMFONT CARDS

WHILE WRITING AND EDITING.

what about all the other possibilities?

or can you really see italics?

you had typed subscript or superscript.

only RamFont lets you display outline.

~~strikethrough~~ from underline.

Do Not Have To Be so confusing.

help you **see changes**.

character sizes: Ee Ee Ee Ee Ee Ee

NOW YOU CAN SEE WHAT YOU MEAN.

Doc 1 Pg 1 Ln 1" Pos 1"

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CIRCLE NO. 300 ON READER SERVICE CARD.



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MONSTER MONITORS

WHEN YOU WANT to see little details, you've got to think big.

When you want your PC presentations to be as large as the impact you hope they'll have, you've got to think big.

When you want your CAD and desktop publishing creations to stand out on-screen and show their worth before you commit to hard copy . . . well, you've got the idea.

The 12-, 13-, or 14-inch displays that sit on most PC users' desks aren't big enough for those showy applications that demand wondrous visuals: presentation graphics, CAD, and desktop publishing.

The new dimension in screen displays is 19 inches or larger—perfect for magnifying hairline rules or getting your point across in (dare we say it) a big way.

Big images dazzle. And if you work with them every day, you'll probably find they're easier on the eyes.

For those in the CAD camp, part of the lure of large screens is, undoubtedly, the influence of the workstation. Anyone who soups up his PC to handle engineering chores will enviously eye the grand glow of big screens on dedicated workstations like those from Sun Microsystems and Apollo Computer. A big-screen display helps bring a PC one step closer to that level.

Amateur editors who toy with desktop publishing systems may want the electronic equivalent of the layout table; they'll find it on one of these monitors. The big, high-resolution displays offer a close view of ligatures and serifs in phosphorescent form.

And when the occasion calls for a pre-

sentation, the big screen turns the personal computer into a public attraction that can tell a story to a roomful of people—not just a few coworkers clustered around your desk.

Moving up to a big screen involves more than just grabbing the first oversized monitor you find. Formats and capabilities vary. Some monitors are compatible with today's favored video standards; others have their own requirements. Some displays are designed for use in a Big Blue world; others are compatible with the Macintosh and the Amiga. The images available range from dull to razor-sharp.

We rounded up five big-screen monitors—the Conrac 7250, the Microvitec Definition 1019/SR, the NEC Multi-Sync XL, the Moniterm Viking I, and the Taxan Crystal View—and looked at them from a variety of angles. The first three are color, the last two black-and-white.

Microvitec offers a low-cost, multi-color big-screen solution, whereas the Conrac 7250 delivers better quality at a higher price. The NEC XL carries a company name that is almost synonymous with monitors. And the two monochrome displays—the Moniterm Viking I and the Taxan Crystal View—provide ultra-high-resolution images for most standard DOS applications.

Screens for Every Occasion

No one monitor is suitable for everybody or for every circumstance, of course. Your application will determine the kind of display you need.

**Give your eyes—
and your screen
images—a break.
Get a BIG screen.
By WINN L. ROSCH**



If you're doing desktop publishing, go monochrome. Desktop publishing software generally supports just one color in print. And if you adhere to the very practical Wysiwyg (What you see is what you get) philosophy, your screen need offer only a single hue. An important consideration is getting a sharp image onscreen, so you'll also want the highest-resolution monitor you can afford.

Presentation graphics, on the other hand, don't require the same sharpness. But contemporary audiences demand a full-spectrum color display. Black-and-white may appeal to film buffs, but it doesn't play well to the rest of the public. Resolution is a consideration, but you'll also want a sumptuous palette of colors to enliven your onscreen images.

CAD swings both ways. Monochrome suffices when your ideas can be shown with a single hue in the form of a blue-print or a simple schematic. But when engineering gets complex and you're

dealing with multilayer circuit boards, layered mechanical drawings, or wheels-within-wheels, color will help you keep subtle differences straight. In both cases, resolution is important: the sharper the distinctions, the easier they are to discern.

Even if you're doing none of those things on your PC, you may like the aesthetic appeal of the big screen. If all you want is a big picture that presents documents and spreadsheets in super-size proportions, choose a monitor that works with one or more of the reigning display standards—CGA, EGA, or VGA.

Why? Those are the standards supported by today's software. You can be sure that your applications will appear onscreen, and chances are your PC is already equipped with a graphics adapter that supports at least one of the standards.

Of the widely accepted standards, IBM's Video Graphics Array (VGA) offers the highest resolution and the most onscreen colors. VGA constructs graphic images from an array of dots, or picture elements (also called pixels or pels), that measures 640 dots horizontally by 480 vertically. It presents them in 256 colors selected from a palette that offers 256,000. The Enhanced Graphics Array (EGA) offers 16 colors from a palette of 64 and presents images in 640-by-350-pixel resolution. The Color Graphics Array (CGA) is the oldest of the three standards and offers 320-by-200 resolution and four colors from a palette of 16.

IBM's new 8514/A standard (named for the model designation of the display adapter that uses it) promises 1,024-by-768 resolution, but it is new, and doubts remain as to whether it will ever be accepted as a true standard. Nevertheless, if upward compatibility is important to you—and it should be—you should make sure that the monitor you buy offers 8514/A compatibility.

Today's big-screen color monitors, including the three reviewed here, incorporate multiscanning abilities—that is, they can work with a variety of graphics adapters, all the way up to the 8514/A standard.

The last generation of big-screen displays suffered because of yesterday's inefficient display standards. If your display supported only CGA, for instance,

Conrac Model 7250

List Price: \$2,995.

Weight: 68 lbs.

Dimensions: 14 by 19 by 21½ inches.

Resolution: 1,024 by 1,024 pixels.

Graphic Standards

Supported: CGA, EGA, VGA, PGC, 8514/A.

Compatible With: IBM PC, XT, AT, Apple Macintosh II, Amiga.

Inputs: TTL and analog inputs using one 9-pin D-shell connector.

Conrac Corp.
Display Products Group
1724 S. Mountain Ave.
Duarte, Calif. 91010
(818) 303-0095

Big Mac Monitors

Big screens on the Macintosh are as nice as big screens on the PC—and probably nicer when you consider that every Mac, from the original 128K to the SE, shipped standard with a cramped 9-inch monochrome display.

There are some large screens that connect to a Mac Plus, a wider selection that will run with the SE, and a boatload that cotton up to the Mac II. Pickings are slim for the Plus because it doesn't offer an expansion slot; plugging in an extra monitor means screwing around with the computer's internal electronics.

With the SE and the Mac II, you can plug a graphics adapter board into a slot and connect the monitor to that

board. The SE has a built-in graphics adapter and monitor, as well as a single expansion slot. The Mac II has no built-in board but does have six slots.

Apple has controlled the system software interface and kept it graphic. The Mac II's NuBus, like the Micro Channel bus in the IBM PS/2 family, automatically recognizes an add-in graphics adapter board.

Adding a large monitor to a PC, XT, or AT usually means setting switches on the monitor's adapter board and dip switches inside the computer case. Most PC monitors can then emulate CGA or EGA, showing you the same information in large type and pictures. If you use special software

drivers to throw more information on the screen at once, they must be copied and configured on the PC's hard disk.

Mac graphics adapters put the device drivers in ROM on the board itself, so that all you need to do is copy a "cdev" file into the proper folder. You configure the monitor by calling upon the Control Panel desk accessory under the Apple pull-down menu and then selecting pixel depth (number of colors or gray-scale levels) and other display specifications in a dialog box.

Apple's own ColorCard produces 640 by 480 pixels, with up to 16 onscreen colors from a palette of 16.7 million. With additional memory, it can muster as

many as 256 onscreen colors.

Many of the large displays offer more pixels—up to 1,664 by 1,200 or more—than you'll find in the Apple hardware.

You'll also want to make sure you have the latest version of the Mac system software and of your applications, because some older versions don't support large displays.

Some monitors—such as the Sony MultiScan and the NEC MultiSync—will work with a PC or a Mac, as long as you buy the right adapter cards.

But remember, if you hook a large monitor up to the Mac first, you may not have the patience to hook it up to your PC later.

—Phil Robinson

you'd just get a blown-up image at the same low-grade resolution when you switched to a larger display.

An image at any given resolution looks worse on a big screen than it does on a small one. Consider what happens to a 35-millimeter photo when you blow it up: it becomes grainy, less sharp. That's what happens when you move to a larger display that supports the same graphics standard you had on the small screen. So if you want a clear focus, choose a color monitor with multiscanning capabilities.

You will find monitors that defy the standards, and there will be times when you want them to do so. The Moniterm and the Taxan fit into that category. Because their manufacturers match the capabilities of the display to those of the controller board, these systems can go in their own directions and paint as many pixels across the screen as you want—within reason, of course.

Their visuals will wow you, and they

Winn L. Rosch is a contributing editor of PC/Computing.

The one big problem with the big screens also happens to be the big reason for buying one: their size.

may be just what you need for CAD or desktop publishing applications. But remember, most PC software is written around standards. DOS and its applications will not support high, nonstandard resolutions without help. If a program can't work with a display adapter and a monitor, it stands little chance of putting an intelligible image on the screen.

Consequently, manufacturers of these displays provide special drivers to run popular programs such as Lotus 1-2-3 and AutoCAD. They also offer drivers to make the displays work with graphic operating environments such as Microsoft Windows and Digital Research's GEM. As long as the display system has a driver for one of those operating environments, any program that uses that environment can put a high-resolution image on the display. A similar driver is required to make a display system work properly with OS/2.

Though these systems support most popular software with drivers, you may have applications on your shelf for which drivers are unavailable. In that case, you

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FIGURE NO. 193 ON READER SERVICE CARD.

may need to plug two monitors into your computer—a standard display so you can use DOS and applications that lack high-resolution drivers, and a big-screen/high-resolution display for your special programs.

Manufacturers realize that having two displays on one desk causes crowding, so almost all have built some form of DOS compatibility into their systems. Taxan even adds a high-resolution text mode that puts large, super-sharp characters on the screen at four times the resolution of a VGA display. Nevertheless, if your display uses a proprietary board, ask about compatibility.

The big problem with big screens also happens to be the big reason for buying one—the size. Who carries the thing? Where do you put it? Certainly not atop your plastic-cased PC. These screens weigh 50 to 70 pounds and come in cartons like those used for dishwashers and prefabricated homes. You'll want a friend—preferably one who owns a forklift—to help you unpack and set up.

Conrac 7250

Weighing in at 68 pounds, the Conrac 7250 is the biggest display we examined. But if you value color and image quality above all else, it's beyond compare.

Onscreen hues glow like jewels against the black matrix of the 7250's antiglare screen. There's very little distortion to its image; straight lines appear truly straight whether you're looking at the center of the screen or near the edge.

If you use it in cramped quarters, though, the 7250's size can be a problem. We're not talking desktop footprint here, we're talking tread marks. The 7250 is a tanklike mass. Bolt it to its optional tilt-swivel stand and it resembles the *Graf Zeppelin* moored at Lakehurst, or a great white whale balanced on a single flipper.

It may be cumbersome, but it certainly is versatile. You can hook it up to just about anything. Its multiscanning display works with any IBM standard color graphics adapter—from CGA to 8514/A, with intermediate stops for EGA, VGA, and PGC. It's also compatible with the Mac II and Amiga video systems.

But while it can be adapted to just about any standard, the 7250 can't always adapt itself. Its specs tell us it can automatically adjust to video signals

ranging up to 60Hz, and it was even able to handle VGA texts at 70Hz. But you'll need to buy an adapter to add 8514/A capabilities to its automatic range, or you can ask Conrac to make factory adjustments for those frequencies.

In fact, you may want other adjustments done before you receive it. There are only three front-panel user controls: brightness, contrast, and degaussing. The on/off switch, matching analog and digital signals, and color coding schemes used by different video standards are at the back.

If you're not a tinkerer, you'll appreciate the simple control system, but be sure the monitor you buy gets properly adjusted at the factory.

The lack of user controls for picture height and width can be a problem if you'll be switching from VGA to EGA graphics. In determining the proper picture height, the 7250 allows for (but is

Microvitec Definition 1019/SR

List Price: \$2,395.

Weight: 59 lbs.

Dimensions: 17½ by 18½ by 19½ inches.

Resolution: 1,024 by 768 pixels.

Graphic Standards

Supported: CGA, EGA, VGA, PGC, 8514/A.

Compatible With: IBM PC, XT, AT, Apple Macintosh II, Amiga.

Inputs: TTL and analog inputs using separate 9-pin D-shell connectors.

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not controlled by) IBM's polarity-switching scheme. The 7250 is factory-set for VGA operation and distinguishes between VGA graphics (480-line mode) and text (400-line mode). It's set to make allowances when you switch, but not to distinguish EGA graphics. Switch to EGA, and your image will shrivel to the center of your screen and suffer a distorted aspect ratio.

Conrac chose this scheme so the 7250 could work with the widest possible range of computers. Panel controls to adjust the height of the image would help.

Microvitec Definition 1019/SR

With its square styling, the Microvitec Definition 1019/SR resembles a television set. The image on its 19-inch tube is as sharp as many you'll see on 12-inch displays. About its only limits are those imposed by your video card. The Definition accepts everything from CGA

Moniterm Viking I

List Price: \$2,395.

Weight: 36 lbs.

Dimensions: 14½ by 17¾ by 15 inches (without tilt-swivel stand).

Resolution: 1,280 by 960 pixels.

Graphic Standards

Supported: Uses proprietary adapter.

Compatible With: IBM PC, XT, AT, PS/2.

Inputs: Proprietary TTL input using 9-pin D-shell connector.

Moniterm
5740 Green Circle Dr.
Minnetonka, Minn. 55343
(612) 935-4151

through 8514/A, as well as signals from Mac II and Amiga graphics.

Digital and analog inputs are both available, and digital is compatible with both CGA and EGA. Analog and digital inputs use separate 9-pin D-shell connectors, and Microvitec also provides an adapter cable so you can plug in 15-pin VGA connectors.

One of the Definition's most attractive features is its bold, front-panel placement of the controls used most often: brightness, contrast, input select, and horizontal and vertical size and position. You'll find them recessed into a small panel at the lower-right corner of the screen. Only the power switch is hidden in the rear.

The Definition handles the graphics standards supported by most software. As long as you rely principally on one graphics standard for long periods at a time—and most of us do—it will perform admirably. What it doesn't handle well is switching between EGA and VGA video modes. The 480-line VGA mode stretches to the edge of the screen, but the 350-line EGA shrinks to the center.

The color and saturation you see on the screen are superb. Position those colors against the screen's black matrix and under the antiglare treatment on the picture tube, and you have a marvelous amalgam. Image geometry is also excellent—straight lines are straight whether they're horizontal, vertical, near an edge, or near the center of the screen.

One flaw mars an otherwise perfect performance: move the active image area too close to the left side of the display, and ringing appears on the screen (a series of faint but bothersome vertical lines near the edge). So you'll need to keep the left edge of the image about an inch from the bezel to minimize the problem.

Priced at \$2,395 (hundreds of dollars less than similar-sized displays), the Definition 1019/SR is an excellent buy for anyone looking for an all-purpose big monitor.

Moniterm Viking I

If you're seeking a high-resolution monochrome display to use with your DOS-based software, the Moniterm Viking I is for you.

It comes with more than a dozen disks (and includes individual manuals) for us-



Read It And Reap.

TO: Anyone interested in writing improvement
FROM: Ken Dickens, ad writer

RE: Writing improvement with NEW Grammatik III, a demo disk, and a contest to get both ABSOLUTELY FREE

"Software to easily help me write more better (not just easier or faster, but "better")?" "Right, Don." that's what I said last year when the president of Reference Software bet a gourmet lunch that Grammatik II could help even me. I lost. He ate quail eggs. I ate crow.

Now there is Grammatik III. Don says "its a super whiz-bang high-tech expert system artificial intelligence writing improvement program that makes Grammatik II (and all other grammar checkers) look like Dick and Jane readers. And he wants to bet lunch again.

What should I do?

He says Grammatik III actually "proofreads" your writing (how can it do that?) for errors in grammar, style, usage, and spelling. It can recognize nouns, verbs, adverbs, articles, adjectives, and pronouns so it catches a number of problems no other grammar or spelling checker can. It's simple to use. Give Grammatik III you're documents name. Watch it work, right on the screen (it can't be that easy, can it?). He says it identifies writing problems, offers suggestions for improvement, and get this, lets you ignore the suggestion and continue, or make changes in your document immediately. Without ever going back to your word processor.

Then he gave me this example which I don't believe even for a minute... Grammatik III might stop on a sentence like "Its a long way to Tipperary," tell you that the word following "Its" is usually incorrect after an possessive pronoun and suggests "It's" instead.

I laughed. I knew it was impossible. Don smiled and very calmly explained that although Grammatik III's not perfect, it finds errors like incomplete sentences,, improper use of homonyms (like "their" instead of "there") split infinitives, subject/verb and noun/modifier disagreements, passive voice and etc. It even catches unbalanced punctuation, doubled words, transpositions (like form/from)... he went on for fifteen minutes.

Software can not do that. Can it? But if it did... better writing brings big bucks (and I do have three kids to support). Should I take the bet? I'm confused. Help!!! Before I try it, tell me if Grammatik III helps your writing. Enter this contest (the details are below), try Grammatik III free, and let's discuss it over dinner. In San Francisco.

Ken Dickens

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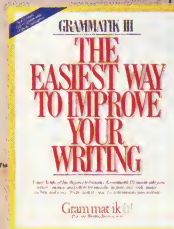
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ing the monitor with Windows and Ventura Publisher, as well as drivers for a host of other programs (including GEM, AutoCAD, Lotus, WordPerfect, and many other favorites). As a bonus, Moniterm also includes Bitstream's Fontware, which can be used to display a variety of typefaces onscreen and in printed documents.

The Moniterm system (which comes with a graphics board, software, and a monitor) is one of the finest on the market. This monochrome monitor is compact, with no wasted space around the edges. It's almost a midget among 19-inch monitors. Its face is nearly black and contrasts well with its bright, paper-white characters.

Moniterm offers its big monitors in three styles. The Viking I, which we received, comes in landscape, or horizontal, trim with your choice of a 19- or 24-inch display; the Viking Portrait has a vertical 19-inch design. All boast a rated resolution of 1,280 by 960 pixels.

You can easily adjust the rear level of the Moniterm to change the viewing angle of the display. Moniterm also offers a tilt-swivel adapter as an option.

The Viking system is built around a proprietary video controller (a full-length PC-based expansion board) that must be installed with the monitor. Although it features a 16-bit AT-style edge connector, you can hook it up to your 8-bit PC or XT by adjusting a jumper on the board.

And if you want to connect a second monitor to your system, the controller accommodates a standard IBM monochrome, IBM color, or Hercules monochrome graphics display adapter. In fact, the Moniterm controller requires you to have one of those boards in your system if you want to perform DOS functions—like booting your system—and run DOS-based applications.

But you don't need a second monitor. The controller comes with a short cable to connect the Viking to the display adapter you already use. Special "frame-grabber" circuitry on the controller converts the output of your normal video adapter into signals for the Viking.

The only side effect of grabbing video signals is that DOS applications may not use the full Viking display.

Shift to the Viking's native mode,



NEC MultiSync XL

List Price: \$3,195.

Weight: 57 lbs.

Dimensions: 19 by 19 by 21½ inches.

Resolution: 1,024 by 760 pixels.

Graphic Standards

Supported: CGA, EGA, VGA, 8514/A.

Compatible With: IBM PC, XT, AT, Apple Macintosh II.

Inputs: TTL and analog inputs through 9-pin D-shell connector, also analog through four BNC jacks.

NEC Home Electronics (USA), Inc.
1255 Michael Dr.
Wood Dale, Ill. 60191
(312) 860-9550

though, and you'll get sharp, detailed, full-screen images.

Software support is the Viking's greatest strength. The Moniterm is ideal if you're running Windows, GEM, or Ventura Publisher, and it's generally good for running other DOS programs.

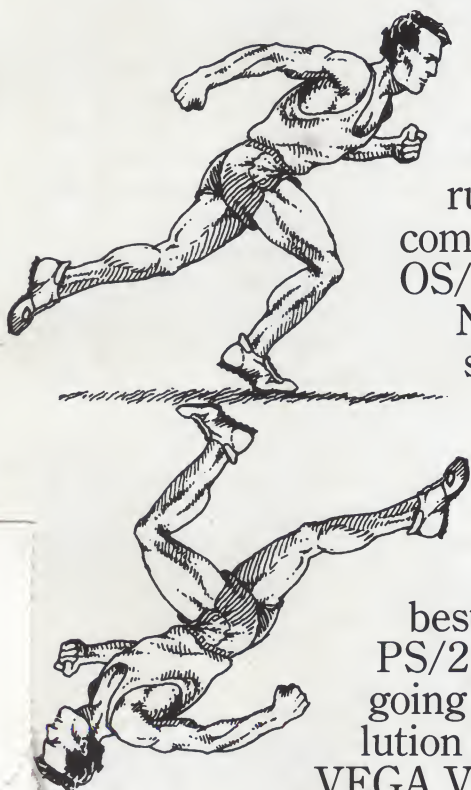
NEC MultiSync XL

NEC was one of the first companies to introduce a color monitor that could automatically adjust its synchronizing frequencies to accommodate the signals it received. That meant it would adjust to any video standard your graphics board supported, be it CGA, EGA, or VGA.

NEC called this ability "MultiSync," put that label on its monitors, and proceeded to sell a lot of them. PC users loved it because they didn't have to upgrade their displays to keep pace with the improving standards.

NEC's 19-inch MultiSync XL, a color

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8514/A: The Look of a Winner?

Nay

IBM's new 8514/A graphics standard looks pretty good at first. With 1,024-by-768-pixel resolution, the screen image ranges from somewhat to a good deal sharper than EGA's 640 by 350 and VGA's 640 by 480. But its color palette, an improvement over EGA's 16 onscreen colors of a 64-color total, only matches VGA's 256 of 262,114.

Look at it awhile, though, and reaction swells to a resounding "So what?"—especially if you're running top-of-the-line business application programs on an expensive, \$2,840 8514/A monitor-plus-video-board combination.

Granted, if you're running anything under Microsoft Windows, you need all the resolution you can get; in that case, you'll like the 8514/A standard. That takes care of, oh, about ten of us.

But for mainstream high-resolution/big-monitor PC applications such as CAD, the 8514/A isn't nearly enough. IBM has punted, suboptimizing with too little resolution and too short a color palette.

To put it simply, the 8514/A standard is too little, too soon. Prices on high-resolution monitors haven't fallen quite enough, and video memory—enough memory to support the standard we need on PCs (something like 1,280-by-1,000-pixel resolution, with a 256,000-color palette)—still costs a bundle.

But IBM wanted a new standard to give the illusion of market leadership and get the bottom-line rewards of obsolescence, so we got stuck with the 8514/A. Tsk-tsk, Big Blue.

You coulda been a contendah.

—Jim Seymour

Yea

Standards are not the stuff of dreams. Anyone can imagine the ultimate display system—resolution figures that exceed a numerologist's ken and more colors than a collision of artists' palettes could create. Economics determines what can be made, and sold, affordably.

The 8514/A standard is practical and affordable. It achieves resolution sharp enough for low-end (read "mass market") CAD applications, and it doesn't require a dream display with a \$2,500-plus price tag. It works with monitors that list for as low as \$1,550, even on IBM's inflated price sheet; street prices are substantially lower.

The 8514/A is VGA and more. It's a pad to draw upon while VGA simultaneously shows you your controls. It also doubles the pixel count on the screen—786,432 compared with

VGA's 307,200—and it broaches the 1,000-pixel horizontal resolution that CAD users demand as a working minimum. It does all this without sacrificing the VGA color palette. Add to that its high-level language and coprocessor-like abilities, which speed up the display as well as the rest of your system, and you've found your contender.

IBM can't make 8514/A an accepted standard, but the rest of the industry will. Other manufacturers' 8514/A video adapters and displays will spur price erosion when they reach the market later this year.

The 8514/A may not work its way into every PC—it's a special-purpose standard designed for applications that just happen to be becoming more commonplace—but it's got the look of a winner.

—Winn L. Rosch

system designed to work with almost any existing display adapter, is an outgrowth of that early success. Priced at \$3,195, it is the most expensive color monitor we reviewed.

Size is the biggest difference between the XL and the original MultiSync. The XL offers a 20-inch tube that yields a viewing area that NEC advertises to be 19 inches. It promises even higher resolution than the smaller MultiSyncs because of its fine .31-millimeter dot pitch and its larger screen size. The dark matrix and the antiglare treatment on the display tube assure bright, clear colors. The monitor is also compatible with the Mac II.

Sounds good? It is, but the size of the active display area doesn't deliver on NEC's promise. It measured barely 16 inches diagonally on our unit, with nearly an inch and a half of black on every mar-


Size is the biggest difference between the NEC XL and the company's original MultiSync.

gin. The XL can handle any IBM standard up to 8514/A, but it squeezes 350-line EGA graphics to the center of the screen.

You can adjust image problems with the full complement of controls (horizontal and vertical size and position) tucked behind a door under the screen. The control range, however, is a bit limited. Widen the image too much or move it too far to the left, and faint vertical shadows appear at the left edge of the screen.

Other controls behind the door include a text mode, color switches (which do not work with analog signals), and an input selector. Contrast, brightness, and power controls are located in front for ready access. A convenient tilt-swivel base is built in.

The MultiSync XL accepts either analog or digital inputs at a 9-pin D-shell connector (a 15-pin adapter is supplied



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for VGA applications), or analog input only at an array of four BNC connectors. Slide switches here select input type and the wiring scheme used by the connectors (CGA, EGA, VGA, and so on).

Taxan Crystal View

The Taxan Crystal View is a complete monochrome display system. You'll need both the monitor (model 1901) and its high-powered graphics adapter (the TX-1280) to run it. They're sold together at \$2,195.

The 1901 display reminded me of something from a Japanese sci-fi flick that gets accidentally radiated, grows to tremendous size, and swings into action, ready to ravage Tokyo or your desktop (whichever it finds first).

Yes, this monitor is big. Its 20-inch tube is masked down to a 19-inch viewing area. The Crystal View is billed as a paper-white monitor, but its medium-gray face gives it the complexion of a black-and-white TV set. Contributing to that impression is the tube's lack of antiglare treatment.

You won't find a profusion of controls on this monitor. There are exactly two—on/off and brightness—and they're both hidden behind the right side of the bezel. The monitor also has a permanently attached signal cable and a detachable power cable.

The rated resolution of the 1901 is 1,280 by 960 pixels, and its onscreen sharpness reflects that rating. The resolution, though, is not a function of the monitor; it's controlled by the TX-1280 graphics adapter.

The TX-1280 is a full-length, 8-bit PC expansion card based on an Intel 82786 coprocessor running at 20MHz. That means it's fast. You can expect super performance. It operates in a 1,280-by-960 proprietary graphics mode and a 1,280-by-800 enhanced CGA mode.

You'll want to use the system's native 960-line mode. The TX-1280 maps the CGA's 16 colors into monochrome by assigning a crosshatch pattern to each one. The technique produces a sharp monochrome image by separating graphic elements, but it can make text unreadable. The CGA emulation produces a stunted image, somewhat shorter than the full screen because of its lesser line count, but the 960-line mode fills the screen to



Taxan Crystal View

List Price: \$2,195.

Weight: 48 lbs.

Dimensions: 19½ by 19 by 16 inches.

Resolution: 1,280 by 960 pixels.

Graphic Standards

Supported: Uses proprietary adapter, CGA-compatible 1,280-by-800 monochrome mode.

Compatible With: IBM PC, XT, AT.

Inputs: Proprietary input through attach cord terminating in 9-pin D-shell connector.

Taxan USA Corp.
18005 Cortney Ct.
City of Industry, Calif. 91748
(818) 810-1291

within ½ inch of each edge.

To let you take full advantage of Crystal View, Taxan provides drivers for Windows, GEM, and their applications, as well as for Ventura and AutoCAD. The system shines in desktop publishing applications, perfect for a side-by-side viewing of two facing pages.

The Crystal View system has one drawback: it uses 17.5 watts, which can be a power drain. Users of older PCs, which have only 65 watts of power, will probably need a bigger power supply to accommodate it. The monitor also steals a system interrupt, which means it may conflict with other hardware.

On the other hand, the Crystal View earns high marks for its CGA and text compatibility (if you don't mind slightly shortened images). It's a very good big-screen system if you want easy-on-the-eyes monochrome images for your everyday DOS software. ■

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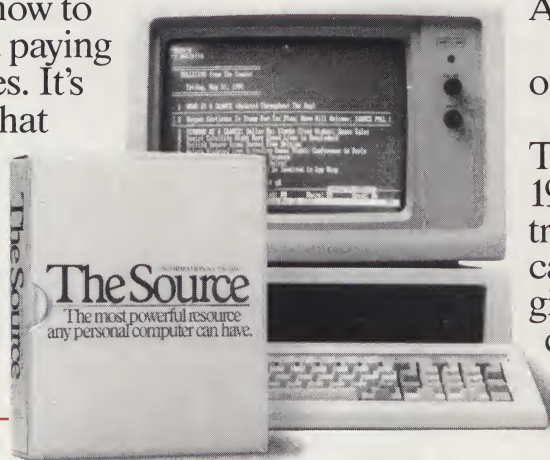
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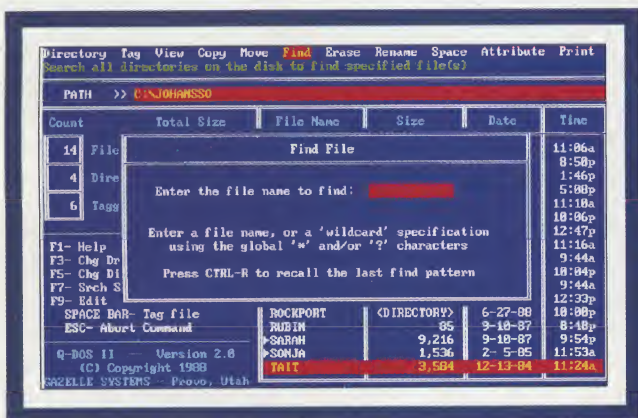
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DOS Front Ends

Four ingenious programs that help you deal with DOS.

By RUBIN RABINOVITZ



Q-DOS II 2.0

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In Short: A fast-working disk organizer with fewer routines than some competitive programs and a number of nice extras, but also a few quirks. Not copy protected.

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UNTIL RECENTLY I believed that people who use DOS shells were probably too uncoordinated to take the training wheels off their bicycles. My few encounters with DOS shells, file management programs, and other software that got between me and my operating system left me cold.

But after trying out some recently released DOS shells, I have to admit they've changed. Or maybe I've changed. I can't entirely believe it, but there it is: I actually find DOS shells useful.

A shell program puts an easy-to-use interactive layer between you and DOS to shield you from the operating system's fickle habits. The program visually displays information about directories, files, and hard disks and makes it quicker and easier to perform many DOS functions, such as creating and deleting directories and moving files from one directory to another.

What's more, I discovered, DOS shells are fun to fool around with. You get to choose background and foreground colors for their data display boxes, which means that I finally can play Mondrian with my EGA display.

I even found myself becoming more than a little interested in the data displayed in these colored boxes. "Wow, 1,067 files," I told myself, "and 134 sub-directories in the root directory with only 1,425,408 clean bytes out of a potentially available 21,309,440 on Winchester C. Time to get hopping on a hard drive upgrade."

I was as happy as an air cadet with his first pre-flight checklist.

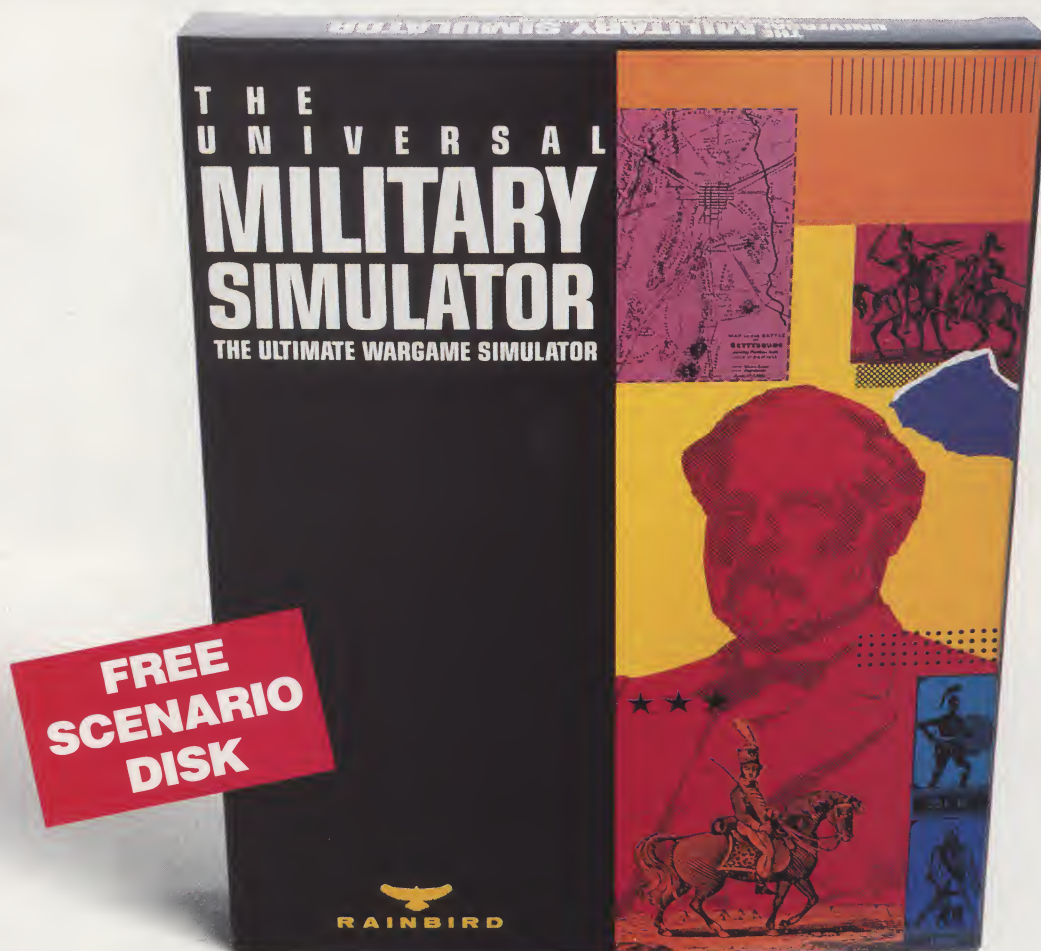
But what won me over was the way the new DOS shells take some of the tedium out of boring operations like backing up files or cleaning up hard disks. The four programs reviewed here—Q-DOS II, Path-Minder, ldir+ (pronounced "won-der-plus"), and XTreePro—each provide a collection of ingenious utilities for file manipulation and hard disk management.

Like the old DOS shells, these recently introduced programs offer substitutes for some DOS commands, such as those used for copying and deleting files or for creating and removing directories. But they go even further than DOS in permitting you to rename directories, to move files into new directories, and to tag groups of files in order to carry out batch commands.

Playing Tag with Your Files

Many of the routines in these programs complement one another in order to simplify tasks that many users perform often. Let's say you need to back up a series of related files onto a floppy disk. A shell program will let you summon a graphic display of your directory tree and move through it, tagging files for copying. Along the way, you can also perform other jobs, such as removing a file's read-only attribute.

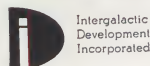
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CIRCLE NO. 273 ON READER SERVICE CARD.

If you've forgotten where a file is, you can use a search routine to locate it. If you've forgotten what's in a file, you can view its contents. Unlike the DOS Type command, which balks at anything that doesn't look like ASCII text, most shell programs will read any file format. And instead of automatically scrolling through the text faster than you can read it, DOS shells let you control the movement of the display with your cursor keys.

To be sure, the file you see won't be neatly formatted, and it may be peppered with control characters, but you still should be able to get an idea of its contents. Some shells improve readability by allowing you to suppress control characters.

When you tag files for copying, a DOS shell offers you another handy feature: a counter that adds up the number of bytes in the group you've tagged. Once the total nears your floppy disk's capacity, you can copy all the files onto it with a single command. During the entire operation you'll never have to type a filename or a backslash.

All of these programs give you easy access to a DOS command line for such functions as running application programs from within the shell. All of them can sort files alphabetically or by size, date, or extension. One program, XTreePro, goes a step further. Its Showall command can display an alphabetical list that includes every file in every directory, and its Global command expands this list to include everything on all your drives—up to 26 of them. Such commands are particularly useful if you have a large hard disk divided into a number of volumes.

The best DOS shell programs also provide simple text editors; all four reviewed here do. At first I wondered why you would need a text editor. After all, most people own word processors. But later, when I needed to make a small change in my Autoexec file, I got a nice demonstration of just how helpful a text editor can be: it turned what would otherwise have been an annoying, disagreeable task into a simple 20-second operation.

Most of the DOS shells are specifically designed for this kind of small chore, so their text editors aren't capable of handling files larger than a certain size. However, ldir+'s editor lets you work with files of any size.

Q-DOS II

This program offers only a few specialized features, but this helps to make it fast and easy to learn. Although the manual lacks an index, you'll probably find you can run Q-DOS without referring to the manual or calling up the help utility.

Rubin Rabinovitz, a professor of English at the University of Colorado, is the author of Samna Luxury Word Processing (Tab Books) and of articles in PC Magazine, Byte, and literary journals.

What won me over was the way the new DOS shells take some of the tedium out of boring operations like backing up files or cleaning up hard disks.



PathMinder 4.10

List Price: \$69.95 plus \$5 shipping; with password option, \$79.95 plus \$5 shipping.

Requires: 256K RAM, one disk drive (hard disk recommended), DOS 2.0 or later.

Compatibility: IBM PC, XT, AT, PS/2, 3270 AT, and compatible computers.

In Short: A full-featured hard-disk-management system that uses very little RAM and includes many valuable extras, such as a system activity log. Not copy protected.

Westlake Data Corp.
P.O. Box 1711
Austin, Tex. 78767
(512) 328-1041

If you're willing to roll up your sleeves and work at customizing, 1dir+ is for you. If you favor the quick-and-dirty approach, consider another program.



1dir+ 2.10F

List Price: \$95

Requires: 256K RAM, one disk drive (hard disk recommended), DOS 2.0 or later.

Compatibility: IBM PC, XT, AT, 3270 AT, and compatible computers.

In Short: A powerful program that's a bit hard to learn but offers many options for customization. Not copy protected.

Bourbaki, Inc.
P.O. Box 2867
Boise, Idaho 83701
(208) 342-5849

Q-DOS employs a 1-2-3-like menu that lets you tab to a choice or press the letter key that corresponds to the first character of a command word; an attractive opening menu leads to all of the program's major commands. The program also makes good use of the function keys. If you don't need a lot of extra features, Q-DOS II is a reasonable choice.

PathMinder

If you *are* interested in extras, PathMinder has a nice collection. Some will be welcome in workplaces where security is a consideration: processes for encoding data, for purging the text of a file by overwriting it with zeros, and (at extra cost) for setting up passwords.

Another unusual feature is PathMinder's ability to log system activities: to track who's using the computer, which tasks are being performed, and how much time is being spent on them. In addition, its macrolike capabilities are useful for customizing the program.

PathMinder is the only one of these programs that offers a special novice mode, which forces users to confirm Delete and other destructive commands. It also uses RAM more efficiently than the other programs tested.

PathMinder wins high marks for ease of use and learning. Its documentation and its help utility are clear, and in general its commands are intuitive. As in Q-DOS, major commands can be executed from a 1-2-3-like menu, with others programmed on the function keys.

PathMinder's drawbacks are minor: complex installation instructions, an index with some incorrect page references, and a text editor that can't provide a hexadecimal display.

1dir+

Both PathMinder and 1dir+ offer utilities for managing applications, and both allow you to create a file that lists every file found in a directory, which can be particularly useful when you need to create a table of contents. But 1dir+ outshines PathMinder with its special routines for writing batch files and for quickly scrolling to any letter in an alphabetically sorted directory.

I found 1dir+ harder to learn than the other programs, but this problem is related to one of its strengths: versatility. Most of 1dir+'s commands can be invoked in three different ways: using a point-and-shoot menu, a function key, or a Ctrl-letter command (of the type familiar to WordStar users). A similar principle applies to 1dir+'s many menus, which present a variety of selections from the program's broad group of command choices.

This program's underlying philosophy might be called a laissez-faire cat-skinning approach. If you can't live with another program's rigidity, if you're

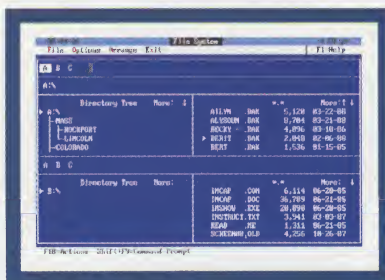
DOS 4.0: Microsoft Joins the Shell Game

After numerous revisions to its time-honored operating system, Microsoft has taken a cue from third-party software publishers and developed a DOS shell within DOS itself.

The new DOS Shell utility is part of DOS 4.0, the latest release of IBM PC-DOS and Microsoft MS-DOS. DOS Shell offers colorful screens, pull-down menus, helpful information, and simplified procedures for many DOS commands: copying, deleting, and renaming files; managing directories; starting programs; printing documents; formatting disks; and more. And if you prefer the familiar DOS prompt, it's still available. Also, routines have been added so you can rename directories, display two directories at once, move files to different directories, sort directory lists, view non-ASCII as well as ASCII files, generate file lists across directories, restrict access with passwords, and execute commands on groups of files.

Unlike most of the rival shell programs, DOS Shell provides good mouse support; this is one of many ways in which it resembles OS/2. Even if you don't own a mouse, though, you'll find it easy to work with DOS Shell's Lotus-type menus, which let you enter commands with a cursor bar or a mnemonic alpha key. After a few days with DOS Shell, the familiar DOS prompt may start to look as outdated as a punch card.

Another impressive feature of DOS Shell is its command-specific help facility: when you issue a command, pressing the help key (F1) summons useful information about the command. You can also display a table of contents that will help you to decide which help screen you want to see. However, the help utility covers only the DOS commands included in DOS Shell—most of which are familiar to experienced DOS users. There are many other DOS commands that cannot be is-



sued from within the shell, and no help is available for them.

DOS 4.0 comes with a 153-page "Getting Started" booklet, and—surprise!—it's well organized and clearly written. Like its predecessors, however, this loose-leaf manual is cumbersome and occasionally obscure. You can always find the answer you need in the new Command Reference manual, a 300-page volume that lists all the DOS routines alphabetically. But the Command Reference manual (like the Technical Reference manual) is what the folks at IBM call "an additional purchase item"; if you want one, you'll have to fork over a few additional dollars. I suppose if IBM ever gets into the restaurant business, it will charge for menus.

Another annoyance is the absence of a feature found in most shell programs: a full-screen text editor for tasks such as updating batch files. DOS Shell's solution goes no further than a reminder about the availability of a program that only its mother could love: Edlin. (If Edlin had disappeared from your disk a year ago, would you have noticed?)

DOS Shell's power is roughly comparable to that of most other shell programs, but it's less intuitive and slightly harder to learn. If all you're looking for is a DOS shell, you'll save money by buying one of the third-party programs. At \$150 (or \$95 for the upgrade), DOS 4.0 is relatively expensive.

On the other hand, the rest of the new DOS program offers welcome improvements that could easily

compensate for its extra cost. Some two dozen routines have been enhanced, and the error messages have been upgraded. There is now a switch in the global Delete command that lists files individually so you can confirm that you want to delete them. Among other new routines are a screen-guided installation procedure, a utility for creating hard disk partitions that exceed the 32MB limit, and a device driver that uses the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS 4.0) to address RAM above 640K.

If you do decide to buy DOS 4.0, be prepared for possible incompatibility. I found, for example, that Lotus Express crashed under the new DOS, and that my old Norton Utilities program wouldn't run (the 4.0 version of Norton, however, worked properly). In addition, my AST Rampage board needed a new memory manager; you can download this program at no charge by calling the AST Corporation's bulletin board, at (714) 852-1872.

In general, DOS Shell and DOS 4.0 are an attractive combination, with features that will interest users at a variety of levels. One of the most promising aspects of DOS Shell is that it assigns no functions to four of the function keys. Is this a hint that future releases will bring even more pleasant surprises? Stay tuned.

—RR

DOS Version 4.0

List Price: \$150; upgrade, \$95.

Requires: IBM PC, XT, AT, PS/2, or compatible computer; 256K RAM (360K to install complete shell program); available in 5¼- or 3½-inch disk formats.

In Short: A new version of IBM's disk operating system, with an integrated shell program and other useful enhancements.

Available from IBM dealers.
IBM Corp.
900 King St.
Rye Brook, N.Y. 10573
(800) 426-7257

willing to roll up your sleeves and work at customizing it, and if you admire the gutsy self-reliance that made America great, ldir+ is for you. But if you favor a quick-and-dirty approach—just finish the job and stop fiddling around—you'd be better off with something else.

XTreePro

XTreePro is the only program in this group whose text editor is equipped with macros. Along with the Showall and Global commands already mentioned, XTreePro has another unusual feature that I like: a DOS command-line editor. It works something like DOS's F3 key, except that it can recall the last ten commands you entered.

XTreePro does have some drawbacks. It uses about 100K of RAM and frees up less memory than the other shells when it runs application programs. It offers only one way to enter commands: by pressing a letter key. Because XTreePro doesn't take full advantage of the function keys, its crowded main menu is supplemented with separate Alt and Ctrl menus. This can make it hard to find a command you're looking for.

If XTreePro's manual has a warning about its text editor's 64K file limit, I couldn't find it. When I was trying to determine the editor's capacity, I encountered a second problem: a tendency to behave peculiarly when saving a file and quitting. When I tried this, XTreePro put a .bak extension on my file and created an empty file with the original filename. Again, I couldn't find any warning about this problem in the manual or in the help utility.

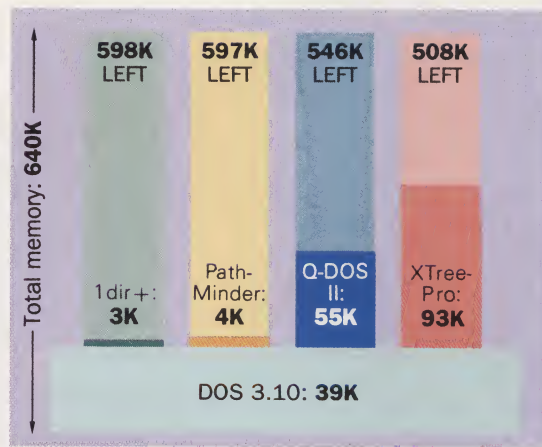
XTreePro is in its 1.0 release, and that may explain these oversights. In many ways, it's an attractive program, even if it is overpriced. Although I wouldn't recommend that you spend \$129 on XTreePro, if you're already a registered XTree user it would certainly be worth getting as an upgrade.

The Envelope, Please

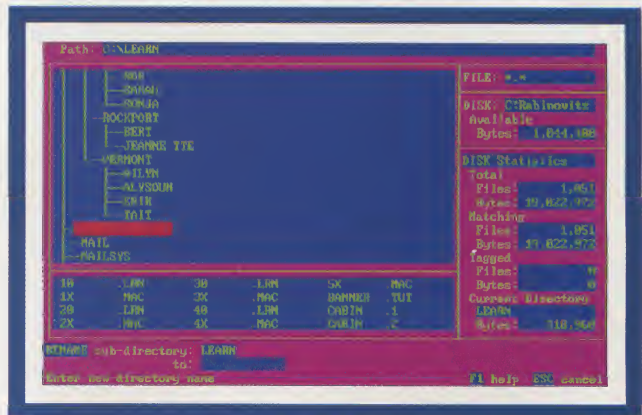
If I had to choose just one of these DOS shell programs, I would select PathMinder. Its price is lowest, and its smooth operation, extra features, intuitive structure, and 4K RAM overhead give it an edge over the other three.

But I suspect I'll be returning to all these programs. ldir+ has some nice routines. Q-DOS II is fast and easy to work with. XTreePro's Global command is one I know I'll be using. Obviously, what I'd really like is a shell that incorporates the best features of all of them.

What's interesting about these four shell programs is how they've evolved to meet the needs of DOS users. No longer is their main task to insulate beginners from the rigors of an austere operating system. Rather, they fill the gaps in DOS by adding features that Microsoft overlooked. ■



MEMORY REQUIREMENTS FOR DOS SHELLS: When the four DOS front ends reviewed here run as RAM-resident software, they take up varying amounts of memory. ldir+, for example, consumes a parsimonious 3K, leaving 598K for other software after DOS's memory requirements are taken into account. XtreePro, on the other hand, requires 93K, leaving only 508K for other applications.



XTreePro 1.0

List Price: \$129

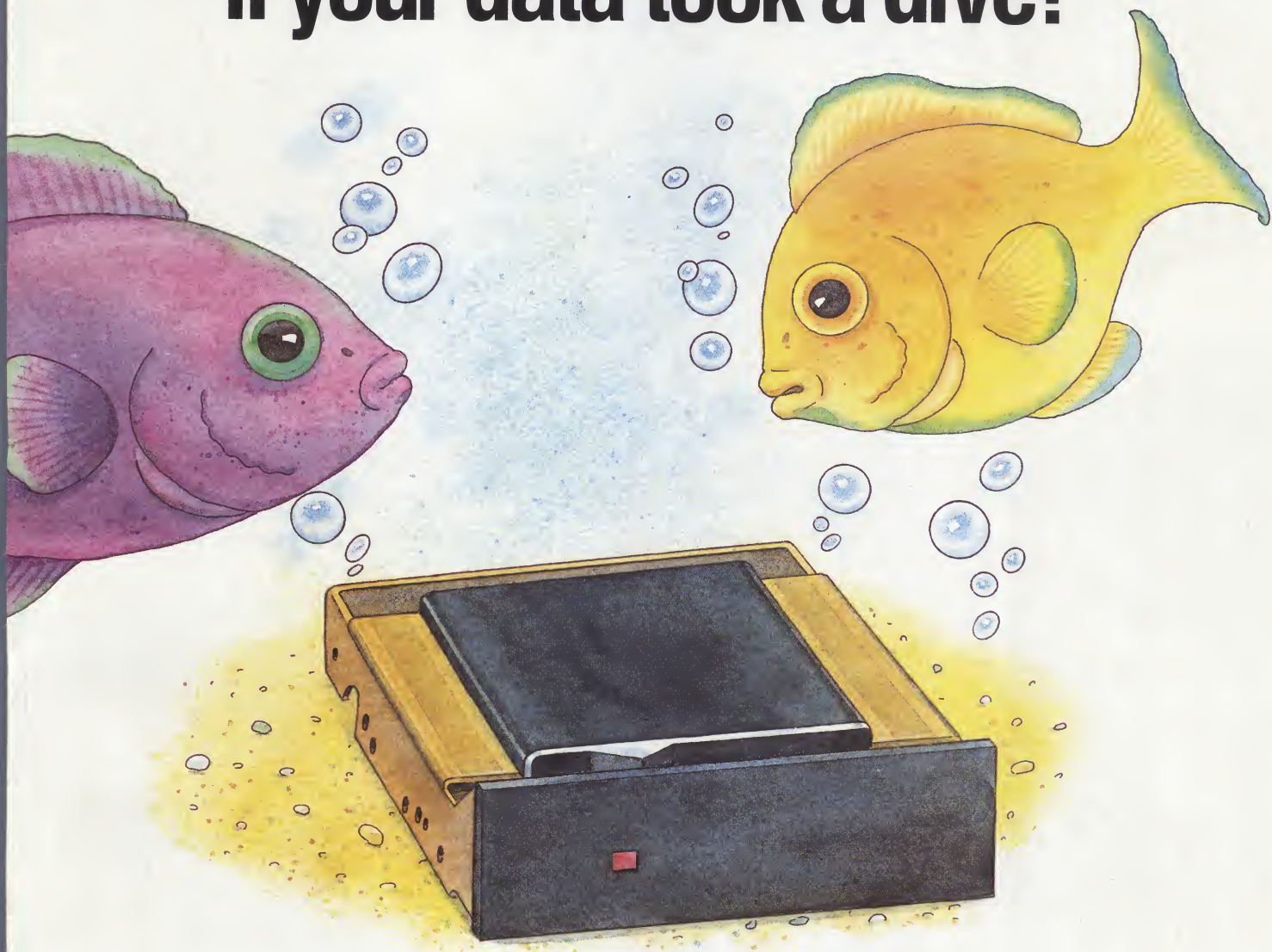
Requires: 256K RAM, one disk drive (hard disk recommended), DOS 2.1 or later.

Compatibility: IBM PC, XT, AT, PS/2, and compatible computers.

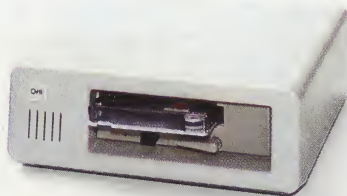
In Short: An enhanced version of the popular XTree program, XTreePro adds such features as the ability to work with files from as many as 26 drives and to log as many as 16,000 files. Not copy protected.

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CIRCLE NO. 280 ON READER SERVICE CARD.

Deli-Style

AT

S

With a bit of this hardware and a dollop of that component, you can have a personalized, low-cost AT.

By LEE THÉ

Bargain hunters know that finding the best price often means bypassing retail stores and heading for the out-of-the-way places your friends tell you about. Now the computer industry has its own flourishing community of off-price PC clone outlets.

Unlike big-name makers of IBM compatibles, these small, low-profile operations buy large quantities of components and assemble their own machines deli style, choosing this component and that to make the finished product. They then sell the hybrid machines locally (generally advertised in the business

pages of newspapers) and sometimes by mail order.

Some people refer to these generic systems as "white-box" computers because their chassis often carry no dealer logos. Others call them "deli-style" computers, for obvious reasons.

Put to the Test

To test our theory that locally produced clones are an affordable entree to linear memory, 16-bit boards, and 286-based software, we visited Benton Electronics in Sunnyvale, California, to see how much horsepower we could buy for under \$1,000.

We left Benton with an AT clone that works and looks like the real thing. Priced at \$999, however, it costs a whopping \$600 less than the Leading Edge D2, the cheapest comparable national-brand AT clone. Even a Leading Edge XT compatible costs hundreds more than the Benton white-box AT.

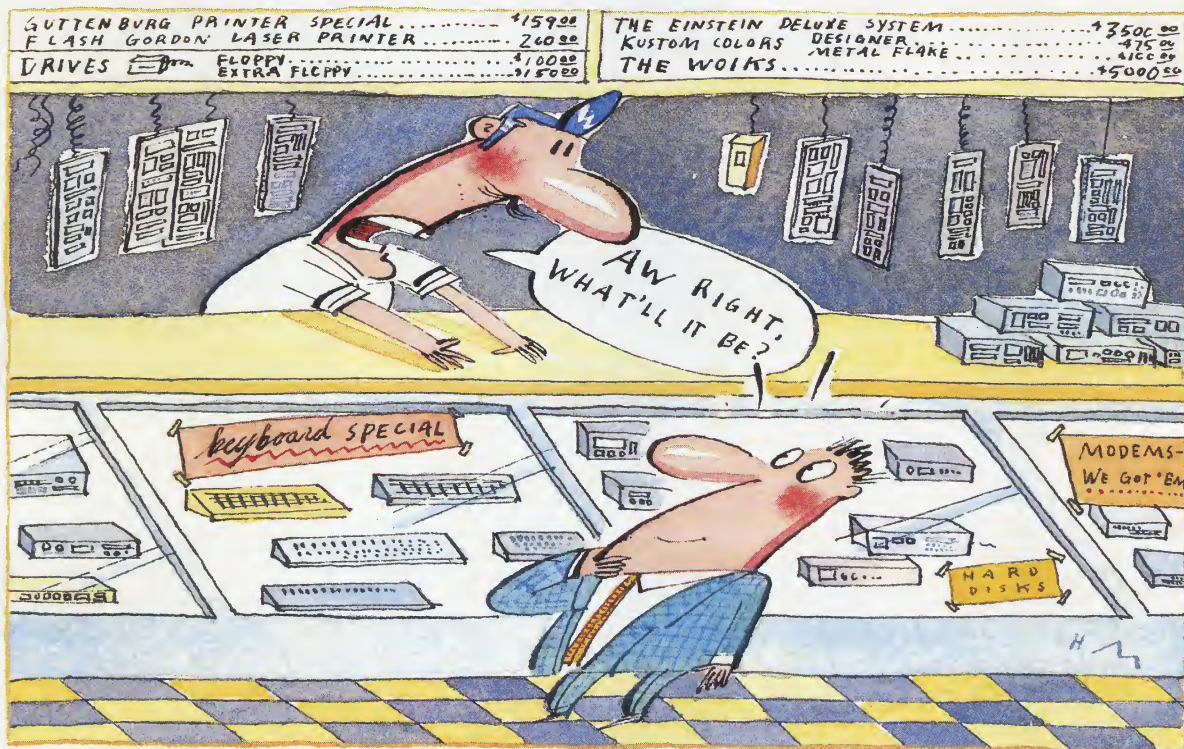
The Benton BAT

Benton designed a system for us that we dubbed the Benton BAT (Basic AT). The BAT has a 6-to-8MHz AT CPU with 640K RAM, an AT-style keyboard

What's the Catch?

Deli-style ATs are just as compatible, expandable, and durable as brand-name machines. What's more, dealer support often rivals that of computer chain franchises.

The catch, of course, is that you must do some homework. For every reliable PC component, there's a cheaper version that has nonstandard plugs and screw-hole locations, wires soldered onto the back of the circuit board, and ROM BIOS chips that balk at Windows or OS/2.



and case, monochrome monitor and Hercules-compatible graphics card, 360K floppy drive, 20MB Seagate ST-225 hard disk (installed and formatted), 230W power supply, and parallel printer port.

To this basic system Benton will gladly add more hardware: a 40MB Seagate ST-251 hard disk (\$146), a 1,200-bit-per-second Everex internal modem with software (\$79), an Everex EGA display board and a Mitsubishi EGA monitor (about \$400), a 3½-inch 1.44MB floppy drive (\$129), and a Citizen 120D printer (\$159).

The company will also add software: DOS 3.3 (\$89) and Microsoft Works (\$145). Works is an integrated package that includes word processing, database, spreadsheet, and communications modules.

You can get the exact system you want instead of having to accept whatever comes in a brand-name bundle. Go ahead—get a special high-resolution CAD monitor or that oddball mouse you like.

So brush up on your computer anatomy and prepare to ask hard questions when you order your parts. Don't hesitate to test compatibility: ask the company to run DOS 3.3, Windows, or Flight Simulator on the machine before buying it.

Your ultimate success with a white-box PC rests on your ability to sniff out a manufacturer that wants your patronage and whose people know what they're doing. Local dealers can be as helpful as mainstream ones—perhaps even more so—especially in terms of support. Benton, for example, offers a one-year warranty on parts and labor. And the company fixed the few problems we had while we waited.

A deli-style 286 PC can satisfy your needs for a long time. But when you decide to move up to a more powerful machine, you should see our dealer's prices on 386 systems! ▀

Lee Thé is special projects editor of PC/Computing.

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The Turbo Clone comes complete, ready to run. Most every option you could want comes as standard equipment. We build the Clone ourselves, right here in Dallas, and we are

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We have been supplying our customers with high quality hardware and software since 1980. Sound engineering, high performance, quality construction, outstanding warranties and a reputation for doing the right thing have been our way of doing business since Day One. As the manufacturer of

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Above kits include XT Controller and cables.

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- 1.2MB Floppy Drive.
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- One Year Parts and Labor Warranty.



This is the finest AT clone yet, and it's from Clone. It has features like real 10MHz (0 wait state RAM) speed. Boots at 6 or 10MHz and you can switch speed on-the-fly from the front panel or from the keyboard during the ROM based setup.

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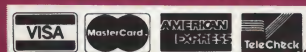
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MAIL ETIQUETTE

**The *PC/Computing* guide to good manners—
and better communications—online. By DEBORAH ASBRAND**



Poor Oliver North. The former National Security Council staff member thought a simple tap on his computer's Delete key would permanently dispose of any electronic mail he wanted to shred.

Unfortunately for Colonel North, members of the Tower Commission investigating the Iran-Contra affair had studied their manuals more thoroughly. Using the backup functions of PROFS—the IBM e-mail system used by the NSC and the White House Communications Agency—they retrieved the messages North thought he had destroyed.

Although better publicized than most, Ollie's e-mail embarrassment is certainly not unique. As electronic mail pops up in offices across the country, people are finding that this new communications tool has its own rules, both technological and social.

For users who don't know the rules, even innocent missives can cause big trouble. One e-mail user, for example, exceeded the subject line's character limit

in an e-mail memo to his superior. Instead of the intended headline—"The employee store wants your assistance"—the boss received a brief-

er version that left out the last seven letters.

To foster use of e-mail systems, and forestall this type of blunder, e-mail vendors have established customer-support teams. These training corps are charged with cheerfully ushering workers into the information age, soothing e-mail fears, and imparting tips of the trade.

E-mail trainers hold classes for everyone from mail-room clerks to corporate brass. Top executives represent only a tiny percentage of e-mail users, but bringing them happily online can spell the difference between success and failure for a company's electronic messaging system.

Five years ago, Citibank set up a private e-mail system in its London branch as part of an office automation project. Installed to serve 25,000 employees company-wide, the bank's MaxCom Comet/11 sys-

tem was used only casually until upper-level executives discovered that e-mail could help them stay in touch while traveling. Once management began to issue memos and messages electronically, the e-mail in-boxes buzzed with activity.

"You either got [the executives'] messages, or you didn't know what was going on," says Marilyn Murphy, MaxCom's product marketing manager. "If your notification of a meeting is coming to you through e-mail, you're going to have to check your in-box."

Other installations present different challenges. When the Chrysler Corporation expanded its e-mail system to include its car dealerships, the shock of the new seemed overwhelming. "Used-car salesmen and auto mechanics—an unlikely audience for PCs," says Kenneth Murphy, messaging products manager for GE Information Services, which handled the installation. "It was a trying experience to bring up 6,000 sites, many of which had never seen a PC. In many cases, we had to hold their hands and set things up for them."

To new users, the concept of e-mail is often mysterious. Sending an electronic message can seem like tossing a letter into an electronic black hole. Trainers do their best, using charts and other visual props, to explain what happens to messages in the system, but separation anxiety remains a concern for e-mail tyros making the switch to electronic messaging.

A person's first few experiences with an electronic mail system are critical. Lost messages destroy confidence in the system, and empty mailboxes discourage users from checking their systems regularly.

Trainers encourage novices to use safety-net functions such as the acknowledgment command, which notifies them when a message they've sent has been received and read. To get neophytes into the habit of checking their mailboxes, trainers ask new e-mail users to send messages among themselves.

E-Mail Dos & Don'ts

1.

Format your messages. Narrower columns are easier to read than those that span the width of the screen.

2.

If you write an e-mail message with your word processor, save it as an ASCII file. Otherwise the formatting codes of your word processor will produce unexpected results on your addressee's screen.

3.

Think before you write. E-mail's convenience prompts some users to dash off several hasty notes, when, with a little forethought, one message would have done the job.

4.

DON'T TYPE IN ALL CAPITAL LETTERS.

5.

Don't send cutesy messages.

6.

Be concise, but avoid choppy, staccato sentences.

7.

Attach a meaningful headline. This gives the recipient an idea of the message's content before he reads the entire opus.

8.

It's a nice touch to sign your name, even though most e-mail systems automatically identify the sender.

Mastering the basic mechanics is only the first step. Polished e-mailers understand that *how* they say something is as important as what they say. Well-mannered people take care with their messages; others bang out blunt, curt notes and letters. Such communiqués may accomplish the senders' goals, but their cold, corporate style wins few friends.

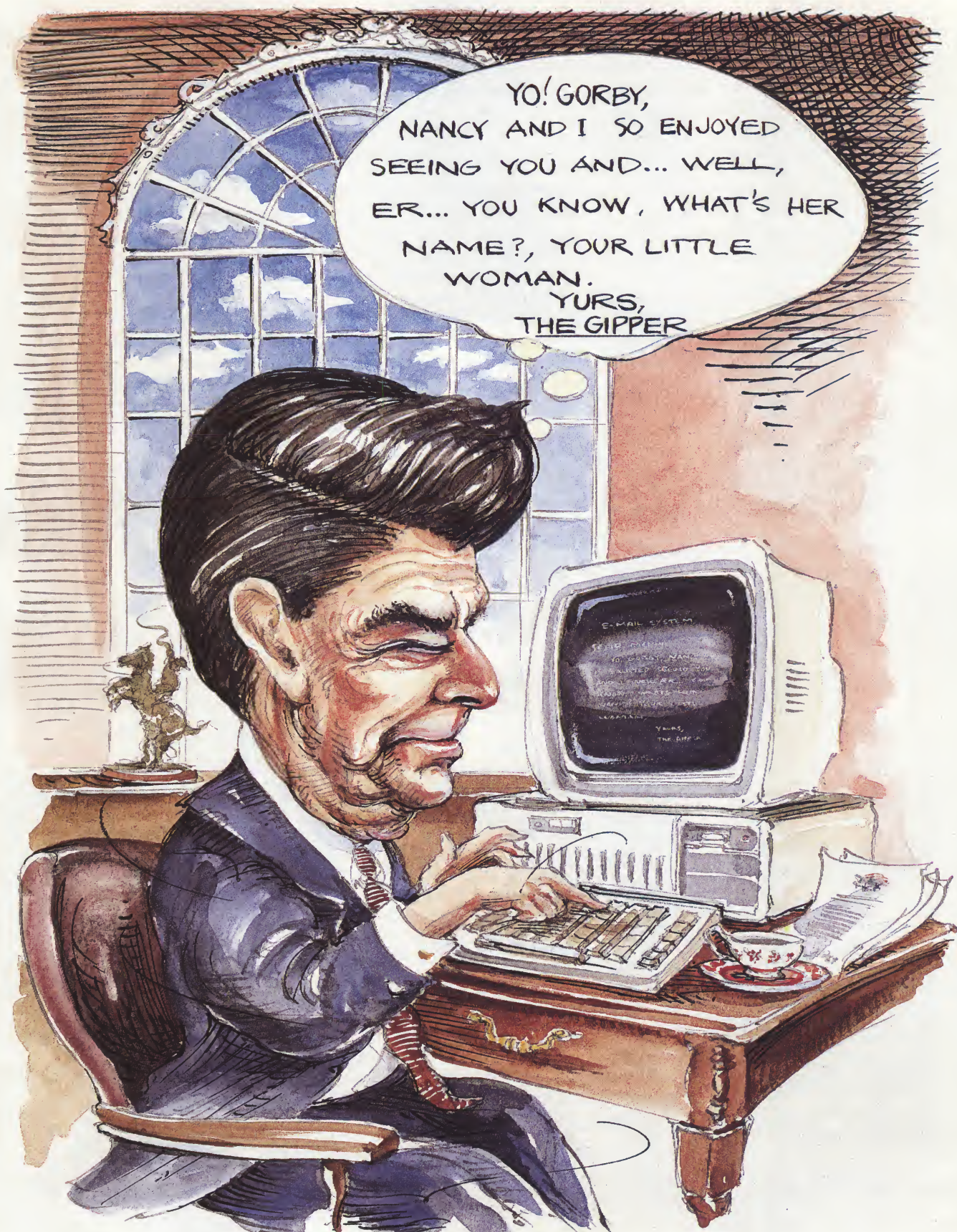
To get along in the e-mail community, users should observe the nuances of e-mail etiquette. Messages typed in capital letters, for example, are guaranteed to make recipients gnash their teeth. "People who type in all capital letters give the impression of shouting at you," says GE's Murphy.

Fran Zarrelli of Telenet Communications, which reaches 250,000 users with its Telemail Plus messaging service, coaches her students to use the CapsLock key only when absolutely necessary. "It's much friendlier to type in upper- and lowercase," she says. "People appreciate those little things."

Another friendly touch is to sign your name to your messages. Even though the system automatically identifies the sender, including your name or some other personal sign-off helps to humanize the text.

At the other extreme, e-mail conversation can be almost too casual. Because e-mail is a relatively informal method of communication, some are tempted to render it a wasteland of literary grunts and groans. E-mail standard-bearers advocate the use of more sophisticated language. Murphy sometimes has to coax complete sentences out of e-mail rookies accustomed to using telex, where the cost is based on the number of characters in the message. "They speak a whole different language," he says. "Their messages tend to be brief and terse. E-mail lets them be more verbose."

Zarrelli, too, educates her students about the impact of the written word. "E-mail can be offensive sometimes," she says. "I always advise them to tem-



YO! GORBY,
NANCY AND I SO ENJOYED
SEEING YOU AND... WELL,
ER... YOU KNOW, WHAT'S HER
NAME?, YOUR LITTLE
WOMAN.
YURS,
THE GIPPER

per their letters and remember who they're directing their messages to."

Newcomers also must remember that e-mail isn't a very private form of communication. As Ollie found out, a message can be retrieved from the system even if neither the sender nor the receiver saves it. Even worse, the touch of a button can send a message along the wrong route. It's particularly easy to send a memo to the person it's *about* instead of the person it's intended for. One employee received a memo critical of her job performance; her boss had intended to send it to his superior but, preoccupied, had entered the wrong address.

Although instructors advise against sending personal messages over e-mail systems, they admit that much of the conversation that once buzzed around water coolers now burns up the wires. Messages regarding lunch dates, weekend plans, and items for sale are standard fare. One New York couple's e-mail relationship culminated in marriage.

At least one consultant welcomes the use of e-mail for personal conversations. Walter Ulrich, a partner with Coopers & Lybrand in Houston, prefers that messages not related to work occur at electronic

Deborah Asbrand is an associate editor of PC/Computing.

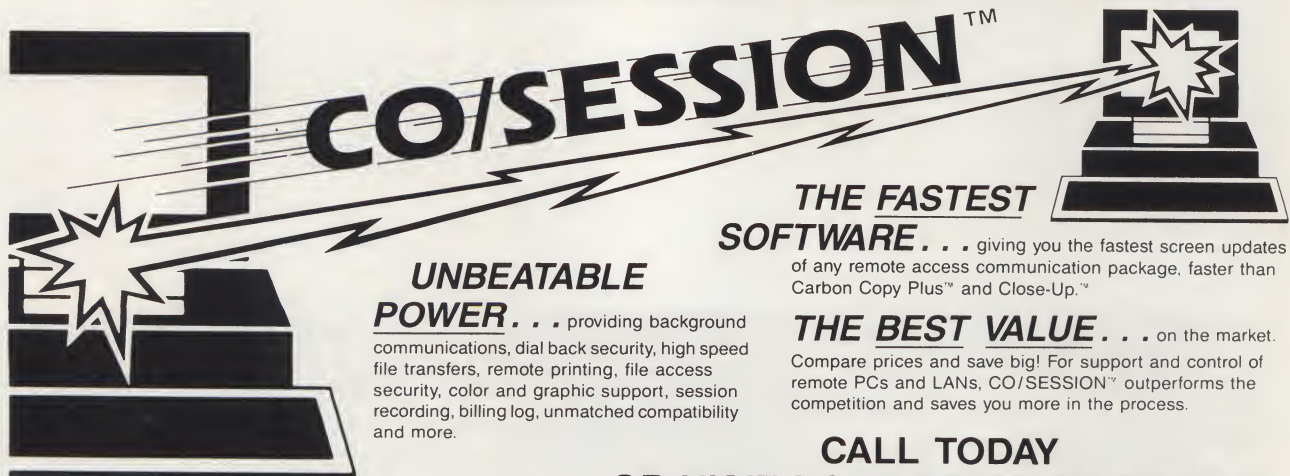
speed. He says, "I'd much rather have people sit at their desk and send an e-mail message about lunch than have them walk down the hall, poke their head in someone's office, and talk for 10 minutes before asking, 'What are you doing for lunch?'"

E-mail has also put a new spin on office subterfuge. "What happens in some organizations is that two peer-level managers are having a discourse, not necessarily friendly, and they go back and forth with memos, and one of them is carbon-copying the boss on it," says Mark Hayward, manager for office services consulting for Coopers & Lybrand. "It's known as 'murder by memo.'" There are even ways to make messages appear—at least initially—to have been sent by another party, a tactic that can result in devastating practical jokes.

Like any new technology, electronic mail can be used for good or evil. It gives users a new means of perpetuating office politics, but it also opens new avenues for sharing useful information. Ulrich, who developed one of the first electronic mail services and has spent 12 years in the messaging field, sees e-mail as an important social tool.

"E-mail is egalitarian," Ulrich says. It can help people at all levels cut across organizational lines and communicate with one another directly, not just through official channels. ■

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It's in the Mail

**This mighty mailing list manager
banishes database overkill.**

By ROBBIN JURIS

You say you need a database. Is what you really need a simple method of managing mailing lists? Then \$49, about ten minutes of learning time, and Best Programs' PC/Label Master will probably do.

The latest version of this appealing and efficient single-purpose tool packs more power for the money and brings more functionality to list management than low-end, general-purpose database products. And PC/Label Master makes the job easier and more convenient than any of the other reasonably priced mailing list managers on the market.

Even the most jaded database programmer would acknowledge that for simple list maintenance, your best bet is an application-specific program that is functionally equivalent to a one-table database, immediately usable, and dirt cheap.

That's a good description for PC/Label Master. Capable of running on IBM PCs, XTs, ATs, PS/2s, and compatibles and requiring just 256K of RAM, PC/Label Master works as well on floppy-disk-based machines as it does on those with hard disks—unless your list is too large for a single floppy. You can store approximately 1,000 records on a 360K floppy disk and about twice as many on a 720K disk. A hard disk, of course, can accommodate far more.

Whichever data storage format you choose, PC/Label Master always tells you how many records you have on file and how many more you have room to store. The package supports most popular laser, dot matrix, and daisywheel printers, as well as color and monochrome monitors. There's even a marginally useful autodialing capability, for those who

06/24/88

A > Add New Record
C > Change File
D > Delete/Recall
E > Edit Record

Last Name:	Ivray
First Name:	William
Title:	Consultant
Organiz.:	Algorithmic
Street:	153 East 32n
City:	New York
State:	NY
Zip Code:	10016
Notes:	APL

MAIN MENU

Enter Selection: A

F > Find Record

G > Previous Record

H > Next Record

N > Notepad

O > Order = Last Name

P > Print Menu

Q > Quit Program

U > Utility Menu

PC/Label Master's main menu layout is hard to beat for simplicity and economy: it gets you where you want to go in a single keystroke.

would like to stash telephone numbers in PC/Label Master's records; in order to use it you need a Hayes or Hayes-compatible modem.

PC software doesn't get much easier to use than PC/Label Master. For example, if you install the program on a hard disk, you won't even have to go to the trouble of creating a new subdirectory: PC/Label Master does the job for you. And you can always recall "deleted" records, because the program never actually removes them from the file—it simply makes them inactive.

The package's 8½-by-11-inch, comic-book-like manual is useful and un-intimidating. Each function is clearly and succinctly described and accompanied by an illustration of the appropriate screen. But you'll soon find these explanations

and visuals superfluous, because you can access virtually all of PC/Label Master's functions through its main menu and invoke almost all of its commands simply by pressing a letter or function key.

The program's well-designed screens and menus deliver one of the great benefits of adopting special-purpose software rather than trying to bend a larger, more complex, general-purpose database package to your scheme: you can be using PC/Label Master productively within 15 minutes of opening the package.

With options laid out across the top half of the screen and a data entry area across the bottom half, PC/Label Master's main menu layout is hard to beat for simplicity and economy: it gets you where you want to go in a keystroke. You can start entering records as soon as the main menu appears: select the Add New Record option and away you go. You can also choose whether to carry any of your data forward to the next record, whether to print each record as it is entered, and whether to auto-

sources
Street

one:

06/24/88

F4-dial F5-print F6-scroll F7-swap

The utility menu extends your influence over your records. You can cut mailing costs by having the program purge duplicate records.

matically enter the date in each record's notes field.

Other main menu selections let you edit and delete records, find a specific record or view the next or previous record, jot a coding scheme or other record notes in a notepad, order your records by last name or zip code, and move to the utility menu for additional options.

Ten fill-in-the-blank fields (last and first names, title, organization, street, city, state, zip code, telephone, and notes) let you enter information as you want it to appear on a label. All but the state, zip code, and phone number fields provide 30 characters of space, so you should have ample room for your data. You needn't worry about capital-letter abbreviations for states: if you're not sure you've entered the correct abbreviation or zip code, you can check your list against the program's state/zip code function, which will catch any erroneous entries.

While some high-end mailing list managers provide as many as five coding fields as well as additional fields for comments or identifiers, PC/Label Master gives you only one—a notes field. At first that doesn't seem to leave much leeway if you need to devote a separate line of your records to social security numbers or postal sorting codes. This limitation is more apparent than real, however; it's possible to construct a relatively flexible coding scheme in PC/Label Master to search for records or select records to print, because codes can consist of single

letters, whole words, or phrases.

At print time, a well-planned coding scheme becomes especially important, and PC/Label Master lets you use codes in combination to refine the process of selecting records. For example, if you use codes A, B, and C to identify different records, you can instruct the program to print records that have either one, two, or all three of those codes. That kind of versatility goes a long way toward overcoming any limitations in the program's simplified coding scheme.

Standard options in the print menu let you specify all or some records for printing in zip-code or last-name order, use any combination of fields to select records, print only those records which fall within a range of zip codes or last names, exclude certain records, or print random records. You can print up to 10,000 copies of a label for any single record in the file, and you can set format specifications for labels, rotary index cards, postcards, and envelopes.

Once you've indicated that you don't want to add more records to your list in a given session, PC/Label Master automatically saves that file as Records.dbf (.dbf is the standard dBase III file extension). In the process it creates one index file for last names (Lname.ntx) and another for zip codes (Zip.ntx). Every time you update and save your list, you automatically update your Records.dbf file.

The best feature of PC/Label Master's export function is that you can use its ASCII-format export files with the mail-merge operations of most popular word processing programs.

It's also easy to import files from other programs, as long as they are standard ASCII text files or in dBase III format. In either

case, each record must consist of ten fields in exactly the same order as PC/Label Master's fields. If the information in a field you want to import is longer than the size of PC/Label Master's field for that kind of data, it can't be imported.

PC/Label Master's import and export functions are invaluable for extending its sphere of influence, but the program's utility menu greatly extends your own influence over your records. For example, you can save disk space and cut mailing costs by having the program find and purge duplicate records. And you can also count selected records, inactive records, and the number of records per zip code.

Of course, what you gain in ease of use and low cost you give up in flexibility. If your needs change and PC/Label Master's data entry screens no longer suffice, you can't change them as you can with some more expensive mailing list managers or with full-fledged database managers. Nor does the program offer access controls or a choice of report formats.

But for \$49, PC/Label Master is a powerful program at a bargain price—an impressive combination that should satisfy almost all PC users who need to maintain mailing lists. ■

PC/Label Master

List Price: \$49

Requires: 256K RAM.

In Short: This efficient, economical mailing list manager packs a lot of power for the money and a lot of goodies for managing lists easily and with dispatch; a good stand-in for a full-fledged database if mailing list management is all you need.

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Robbin Juris is an associate editor of PC Magazine.

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MATH WHIZ

Stephen Wolfram is a shooting star in the math universe, aiming for both popular acclaim and financial gain.

By JEFFREY BAIRSTOW

Either you love math or you hate it. If you love it, a brilliant young British theoretical physicist by the name of Stephen Wolfram has a software tool that will enchant you. If you hate it, Dr. Wolfram believes, a dose of his system will ease your pain.

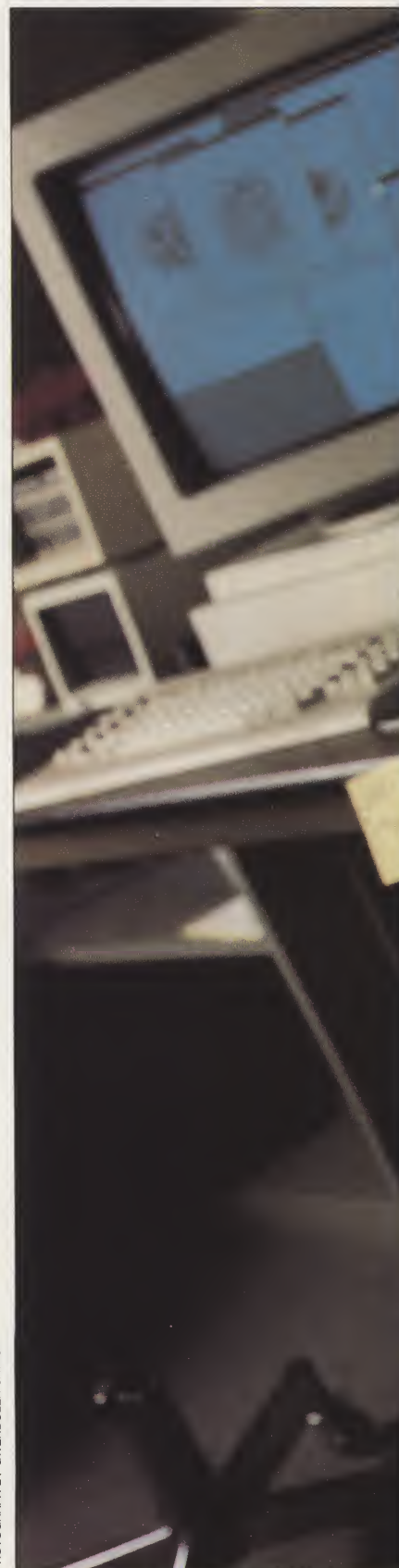
"Stephen's program will change practical engineering," says John Gage, science director for Sun Microsystems, a leading workstation manufacturer that intends to offer the system to its customers. "It will change the way science is done and the way math is taught. Stephen has created a tool that will bring essentially all of applied mathematics to everyone's desktop."

Just what is Wolfram's patent elixir of math? It's called Mathematica, a name suggested by Wolfram's old buddy Steve Jobs, formerly of Apple Computer and now the driving force behind NeXT, a long-awaited workstation that will come bundled with a copy of Wolfram's system.

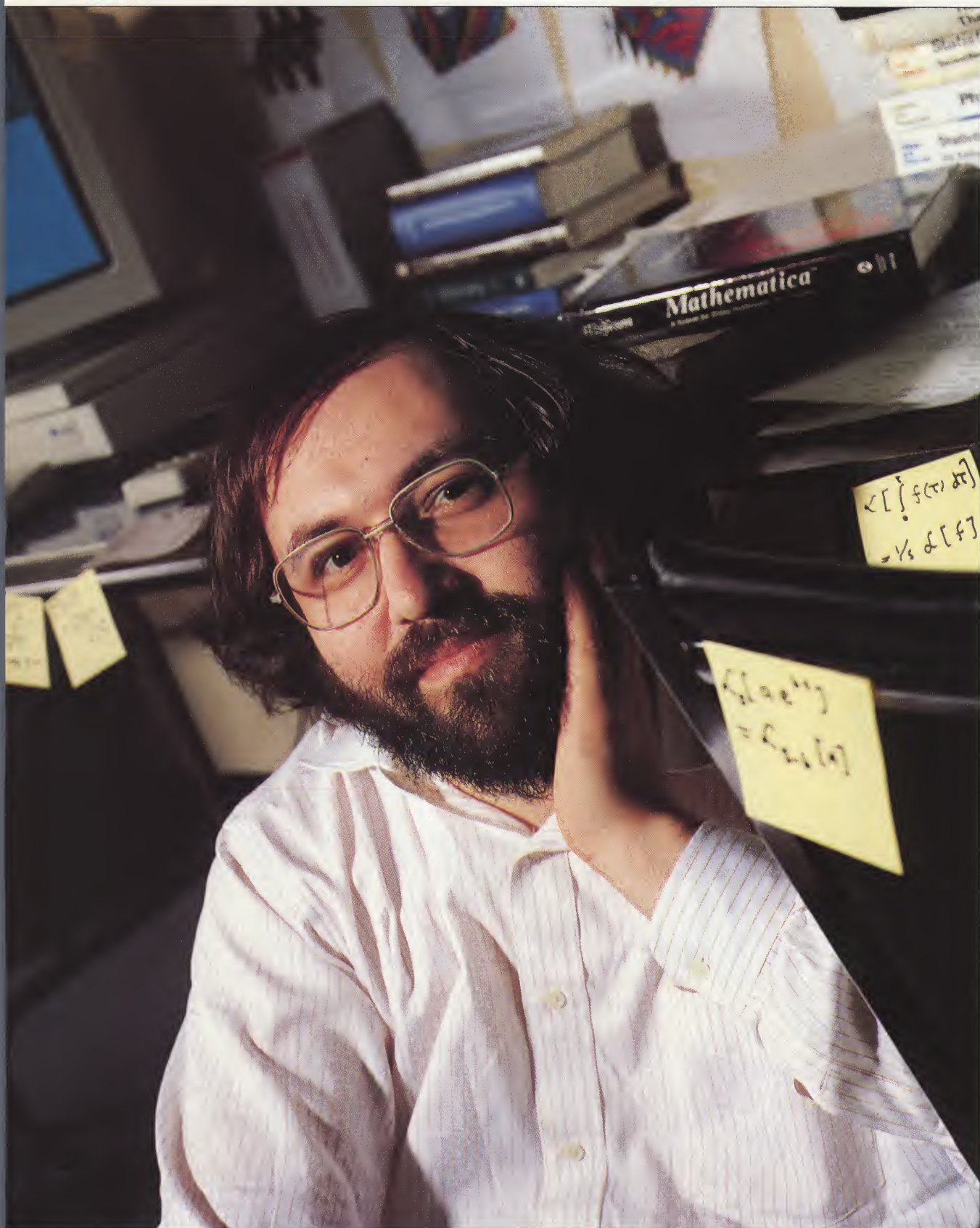
Jobs goes so far as to call Mathematica "mathematics for the rest of us," echoing Apple's original slogan for the Macintosh. While that phrase may contain more than a dash of hype, Mathematica and Stephen Wolfram deserve our close attention, in or out of a math classroom.

Indeed, some feel that Mathematica may do for math-avoiders what Lotus 1-2-3 did for those of us with a pronounced fear of finance.

The program, intended for mathematicians, scientists, engineers, and students, can quickly solve extraordinarily complex equations, perform numeric calculations and symbolic manipulations, and speedi-



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ly draw two- and three-dimensional graphs. It will run on a wide variety of computers, from personal systems to supercomputers.

The full Mathematica system involves two parts: a kernel that does the computations, and a front end that interacts with the user. The kernel works the same way on all types of computers, while the front end is set up to take advantage of the graphics capabilities of a specific type of computer, such as the Macintosh's user interface. And a Macintosh front end, for example, can work with the kernel on, say, a Sun workstation or an even larger system, for added computational power.

Whether Gage's expansive prediction about Mathematica's future will come true remains to be seen. Wolfram and his math project are certainly getting noticed outside a field that is notorious for sending the rest of the world to sleep faster than Johnny Carson. Brilliant mathematicians and advanced theoretical physicists tend toward meteoric but largely invisible careers that launch them into the academic stratosphere when they are barely out of diapers. Bertrand Russell wrote his masterwork *Principia Mathematica* at the turn of the century, when he was barely 30, but he did not achieve popular fame until the late 1950s, when he became an outspoken foe of nuclear weapons.

Low Style, High Tech

For the moment, the center of Wolfram's universe is a 25-person company called Wolfram Research, buried in a curious, fifties-style circular office tower in downtown Champaign, Illinois, not far from the DeKalb Feed Store and the John Deere tractor dealer. Here, the seeds for Mathematica were planted less than two years ago and nurtured by Wolfram and a motley crew of mathematicians and computer scientists, mostly from the University of Illinois, a school so large that even the town of Champaign appears to be a suburb of its vast campus.

Indeed, at first glance Wolfram Research might be just any other impoverished university research center. The fledgling company inhabits a warren of tiny, misshapen offices furnished in basic Goodwill Industries Contemporary, with walls heavily decorated by yellow Post-its, most of them full of mathematical hieroglyphics. The parking lot adjacent to the office building is full of beat-up Saabs and crummy Volkswagens. Wolfram's VW is often in the lot until 6 A.M. as he works on Mathematica and the problems of starting a business.

Jeffrey Bairstow is a magazine editorial consultant based on Cape Cod.

What distinguishes Wolfram Research from the insurance agents, farm lawyers, and the rest who inhabit Huntington Towers is the profusion of high-powered workstations from Sun Microsystems and Silicon Graphics that are perched precariously on the makeshift tables and desks. Most of the worksta-

From amid the clutter arises a disheveled, shaggy-haired, bearded programmer in dungarees and Birkenstock sandals. A visit to Wolfram Research is like a time trip back to the 1960s, when anyone over the age of 30 was suspect.

tion displays flicker with the same hieroglyphics that fill the notes on the walls. Except for those workstations, a visit to Wolfram Research is like a time trip back to the days of programming in the 1960s, when beards, sandals, and dungarees were in and anyone over 30 was suspect.

From amid this clutter of modern technology rises a disheveled, shaggy-haired, bearded programmer in dungarees and Birkenstock sandals. Despite the beard and receding hairline, he's clearly not yet 30 years old.

Wolfram's own office is barely larger than a walk-in closet. A Formica-topped desk, a plain metal table, a black metal filing cabinet, and two utilitarian chairs amply fill the space. One surprise is that there is no computer, not even a humble Macintosh. "Other people here need workstations more than I do," says Wolfram with a matter-of-fact shrug. The only clue to his chief executive status is a huge pile of pink telephone slips, although during the course of an afternoon the telephone does not ring once.

Why Illinois? Why Champaign? Wolfram's other hat is that of a professor of physics, mathematics, and computer science at the University of Illinois, a position he has held for the past two years, but he is "devoting less and less time to that." For several years the university has had a well-deserved worldwide reputation in advanced computer science. Consequently, Wolfram's company has been able to attract "some of the best minds for much less than they would cost in Silicon Valley or on [Boston's] Route 128." Indeed, most of Wolfram's staff also hold positions at the university, which seems remarkably tolerant of such dual allegiances.

Scattered about the offices of Wolfram Research are copies of *Mathematica: A System for Doing Mathematics by Computer* (Addison-Wesley, 1988), a volume of nearly 750 pages. True to his publish-or-perish academic origins, Wolfram wrote the book before the software was complete. It is both a bible for

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mathematicians and a manual for anyone seriously interested in using his software.

"If it isn't described in the book, it's not in the software," says Wolfram, clutching the volume like a proud father. The book is part of a concerted effort to have Mathematica accepted as a standard language in the way that Basic and Fortran became standard computer languages. Although it's hardly bedtime reading, *Mathematica* is selling well. It is already being revised for a second printing only two or three months after the initial publication of 10,000 copies.

The book is a clue to Wolfram's personality. His name appears in large type on the cover and the title page. Inside, much smaller credit is given to the seven other architects of the software system. Despite his self-deprecating academic manner, Wolfram has an ego as big as the expanding universe. And why not? He has the kind of brain that cannot be registered by the conventional scales of schooling or achievement. He has flitted around much of physics, mathematics, and computer science and has even tried his hand before at entrepreneurship. Now he's aiming for big-time success in the software business.

A Restless Scholar

Like many academic geniuses, Wolfram is a curious mixture of prodigy and problem child. Born in London in 1959, his father a businessman and his mother an Oxford philosopher, Wolfram bounced around the British educational establishment without noticeable benefit to either himself or the schools he attended. After a brief sojourn at Britain's most elite private school, Eton, where he wrote his first two scientific papers but didn't take the trouble to graduate, at 17 he became a research assistant in Oxford's legendary Rutherford Laboratory, a preeminent center for physics research.

Wolfram also enrolled as an undergraduate at Oxford, but he found his time there "worse than boring." On his first day, he attended some first-year lectures that were "just awful." On his second day, he went to some second-year lectures and found them "pretty terrible." Naturally, on his third day, he went to some third-year lectures. He found them unacceptable, too.

After breezing through his first-year examinations without attending any more lectures, Wolfram left Oxford. He ended up as a physics researcher at the Argonne National Laboratories, near Chicago. By this time, his published papers had begun to attract attention from the leading theoretical physicists of the day, notably Nobel Prize winners Richard Feynman and Murray Gell-Mann of the California Insti-

tute of Technology in Pasadena. Caltech was then, as now, a magnet for rising young physicists. Still without a degree or diploma of any kind and barely 18 years old, Wolfram was quickly invited to start graduate studies there.

Although he found the stars of Caltech "something of a disappointment," Wolfram began to churn out papers at an astonishing rate. Since research in theoretical physics is heavily dependent on extraordinarily difficult mathematics, Wolfram also became a computer junkie, devouring computer time and overdosing on every high-level math program he could lay his hands on. He became an expert on symbolic manipulators, an arcane class of software of which the most widely known example was Macsyma, a program that had been under development at the Massachusetts Institute of Technology for more than 15 years.

Becoming increasingly frustrated with the "hugely kludgy" Macsyma, Wolfram tried to persuade Caltech to fund the development of a new software system for complex algebraic computations. Despite "overt hostility from the academic establishment," he managed to assemble a group of graduate students and write his own Symbolic Manipulation Program (SMP) in little more than a year. "I learned a valuable lesson," he says. "If people laugh at your idea and tell you it can't be done, then that's a project that will be worthwhile doing."

Like Wolfram, SMP was a problem child from the beginning. When the program was nearly complete, Wolfram started a company, the Computer Mathematics Corporation, to market it. This effort led him into a series of fights with both Caltech, which insisted it owned the rights to SMP, and with his company's venture capitalists, who insisted that they knew

In the face of overt academic hostility, says Wolfram, "I learned a valuable lesson. If people laugh at your idea and tell you it can't be done, then that's a project that will be worthwhile doing."

how to sell his program. Wolfram says both were wrong.

After losing both of these bitter and prolonged battles, but gaining valuable insight into the world of entrepreneurship and bolstering his bank account, Wolfram quit Caltech and fled California in a funk. Like other intellectuals before him, Wolfram found refuge in Princeton's Institute for Advanced Study, the former home base of Albert Einstein. While at the

(continued on page 213)

Math for the Rest of Us

I can imagine a time when educators of young women, noting that fewer and fewer of them were mastering the spinning wheel and the loom, predicted the end of civilization due to a lack of clothing. Yet dependable cloth-producing machines developed fast enough to save the human race from extinction. More recently, as fewer and fewer students seemed to be mastering arithmetic, educators were quick to sound the alarm that the country would soon suffer economic collapse because nobody would know how to make change. Yet today's cash registers do a fine job of making change, and my wristwatch does division to eight decimal places.

In spite of the lessons of history, when I saw Mathematica demonstrated by its principal architect, Stephen Wolfram, my first thought was that if this program finds its way into the educational system, it will make math so easy that our ability to do calculations and solve problems in conventional ways will rapidly atrophy, thereby thrusting us back into the Stone Age.

Within a few minutes of sitting down with Wolfram and his program, however, I had overcome my reactionary fear and was engaged in developing a lesson for my calculus class.

The Power of Three

If you think of Lotus 1-2-3 as a cross between a calculator and Pac Man, then Mathematica is a cross between a mathematics graduate student and a Porsche 959. It performs three primary functions, all of which have appeared to some degree in earlier software packages, but have never before been so well integrated or so powerful.

First, Mathematica performs numerical evaluations of mathematical expressions like $2 + 2 = 4$, or 1,000 factorial (the product of all the integers from 1 to 1,000). This latter expression fills several computer screens with digits in a few seconds. Programs such as Mathsoft's MathCAD and Borland's Eureka can do such evaluations, but not with as much power.

Second, Mathematica performs symbolic manipulations of considerable complexity. For example, if you ask it to find the factors (the terms that, when multiplied together, form an expression) of

$$4 - 12x + 28x^2 - 52x^3 + 64x^4 - 64x^5 + 48x^6 - 16x^7$$

the program responds with

$$-4(-1 + x)^3(1 + 2x)^2.$$

If you ask for the integral of $x^4 / (x^2 - 1)$, it comes back in seconds with

$$x + \frac{x^3}{3} + \frac{\text{Log}[-1+x]}{2} - \frac{\text{Log}[1+x]}{2}$$

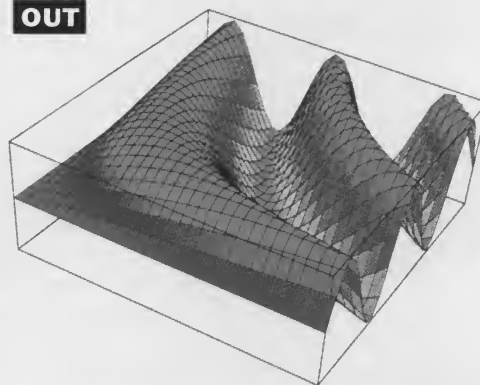
I was initially troubled by the thought that if Mathematica made a mistake on a problem like this, you might never detect it. But most such operations, although difficult to derive by hand, are easy to check by hand: one simply multiplies the resulting factors or differentiates the integral.

Furthermore, when I was studying physics in graduate school, we often spent hours solving problems like the above, no doubt making many more errors than Mathematica would. Worse yet, it was easy to get so involved in the algebra that we lost sight of the underlying physics.

The third thing Mathematica is good at is graphics—in both two and three dimensions, in either color or black and white. For example:

IN Plot3D [Sin[x y], {x, 0, 4}, {y, 0, 4},
PlotPoints -> 30]

OUT



A program so vast and so new will no doubt contain a number of bugs. The only one I found in Mathematica was some difficulty in editing the graphics settings. After calling for technical support, I corrected the problem in minutes using ResEdit on a Mac II.

Hypertextbooks

Mathematica is not for the casual computer user, and in its Mac version it requires at least 2.5MB RAM to run smoothly. However, it is hard to imagine a mathematician, physicist, economist, or engineer who should not at least be aware of this technology.

Perhaps the most important immediate use for Mathematica will be in education. There will be those who say that zipping through examples in Mathematica will prevent students from seeing the details they would see if they did all their algebra by hand. I think, however, that using Mathematica will be like crossing Wyoming by car instead of on foot. A car is much faster, and you always have the option of pulling over to the side of the road to study the rocks.

In this regard, I foresee "hypertextbooks" on quantitative subjects—books that will encourage students to experiment with formulas to gain multiple points of view. One can often view a physics or math problem as a mystery to be solved. Instead of "Who killed the victim?" the problem becomes something like "Which value of x and y maximized the function?" Imagine a word processor so sophisticated that, in changing the murder weapon from a high-powered rifle to a knife, it automatically moves the murderer from a window in a neighboring building to the victim's room, and you have some idea of what a hypertextbook in Mathematica might be like.

A section of hypertext might look like the following brief introduction to multivariate calculus that I prepared for my class.

In the example, "In" shows what you type on your keyboard; "Out" indicates how the computer will respond. Also, the caret tells the computer to raise the variable to the power that follows. For example, y^2 means y^2 .

Multivariate Calculus For Boy Scouts

*A Function of Two Variables
May Be Viewed as a Mountain
Range*

Think of x as the longitude, y as the latitude, and $F(x,y)$ as the elevation above sea level.

The function we are going to use here is:

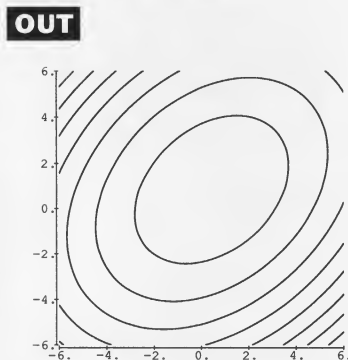
IN $F = 3x - 9x^2 + 6xy + 12y - 9y^2$

OUT $3x - 9x^2 + 12y + 6xy - 9y^2$

If you ever went hiking in the mountains as a scout, perhaps you used a contour map that displayed lines of equal altitude. Mathematicians use similar

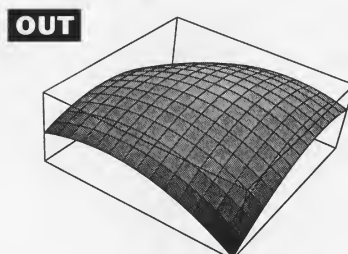
maps to display functions of two variables as shown below for the function F above.

IN ContourPlot
[F, {x, -6, 6}, {y, -6, 6}]



Here's a 3-D picture of the mountain represented by the function F :

IN Plot3D
[F, {x, -6, 6}, {y, -6, 6}]

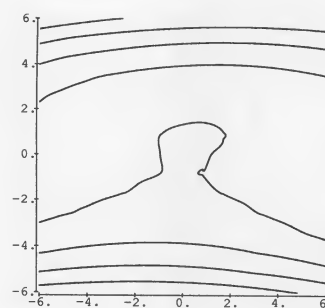
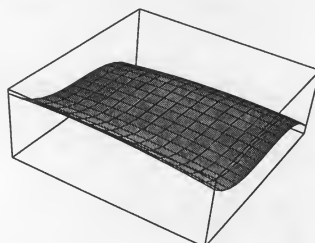


At this stage Mathematica was asked to find the maximum of F (the place where the mountain levels off). The result was:

$\{x \rightarrow \frac{7}{16}, y \rightarrow \frac{13}{16}\}$

Once the above was input, I changed y^2 to y^3 in the formula for F . A very different mathematical story was then played out.

First off, the 3-D and contour plots let us know we were no longer on the same mountain:



Next Mathematica found not one but two places where this new mountain leveled off, with algebra thick enough to cut with a knife—yet the program was barely in second gear.

$\{x \rightarrow \frac{29 + 8 \sqrt{22}}{162}, y \rightarrow \frac{2 + 8 \sqrt{22}}{54}\},$

$\{x \rightarrow \frac{29 - 8 \sqrt{22}}{162}, y \rightarrow \frac{2 - 8 \sqrt{22}}{54}\}$

Next I tried y^4 instead of y^3 . Again, the program solved the problem quickly.

Unfortunately, the inclusion of the algebraic result in this article would overcome the average reader's ability to stay awake.

Will Mathematica Survive?

For a program to be truly successful, it not only must be technically sound but also must establish itself as an industry standard; it must become so popular that it becomes almost an extension of our natural language. Lotus 1-2-3 made it; VisiCalc did not. MS-DOS made it; CP/M did not.

I believe that Stephen Wolfram is taking the right approach in getting Mathematica bundled with a number of machines, including Steve Jobs's NeXT hardware. Mathematica is so deep and so powerful that, if it builds a user base quickly, it will be difficult to unseat as the industry standard.

—Sam L. Savage

Savage, a mathematician, is chairman of General Optimization and a senior lecturer in management science at the University of Chicago.



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institute, he received the prestigious MacArthur Prize Fellowship, a \$128,000 award intended to give the young scientist the freedom to pursue pure, unsullied research with total fiscal independence. When asked what he did with the prize, Wolfram says, "I banked it," his expression indicating amazement that the question was even posed.

At Princeton—"a pleasant enough place to hang out"—Wolfram became interested in cellular automata, an abstract class of objects with deceptively simple structures that can be replicated in random ways, much as a snowflake grows from a single crystal of ice.

After a few years, Wolfram became increasingly restless with the comfortable seclusion of the IAS and began to cast around for a place to make a new start—an environment that would give him the independence he clearly needed. He was offered several appointments with prestigious institutions, but the University of Illinois came up with the most attractive combination of funding and freedom, in the form of his very own Center for the Study of Complex Systems. The new center is on the university's huge campus at Champaign-Urbana, deep in the farm and Bible belts of central Illinois. Wolfram continued to churn out highly regarded papers and even started his own academic journal, *Complex Systems*, a *Reader's Digest*-sized volume that most people would have to struggle with mightily to read beyond the first page. But the aftermath of the SMP fracas still nagged him.

Hard Work Pays Off

Comfortably ensconced in Champaign, and without the distractions of persnickety academic infighting, Wolfram started work on what was to become Mathematica. He began gathering the team that eventually became the nucleus of Wolfram Research. This time, he decided to avoid clashes with investors by funding the company from his own pocket. Just how much investment is involved? "I neither know exactly nor wish to tell," Wolfram says. An educated guess would put the figure at something approaching half a million dollars. Wolfram does not enjoy the lifestyle of a rich man, but he's no starving academic either. In addition to the money he made from the SMP venture, he's had several lucrative consulting contracts with Bell Labs, the Los Alamos National Laboratory, the Thinking Machines Corporation, and other organizations.

Working around the clock and expecting the same from his staff, Wolfram wrote much of the core code of Mathematica himself. It's a huge program, and it's written in an object-oriented extension of the C language. Consequently, substantial computing capabil-

ities are required to run Mathematica. The Macintosh version devours at least 2MB of addressable memory and runs best in around 4MB. IBM offers a version for the IBM PC-RT system that requires a minimum of 8MB of memory. Other versions of Mathematica have been announced for the larger Sun and Silicon Graphics workstations and for Ardent and Stellar supercomputers.

At this stage in Mathematica's development, Wolfram is actively seeking agreements with hardware makers who will distribute the program with their

Wolfram has learned a lot about wheeling and dealing in the computer industry, and he's had some surprises.

"I found out that the more outrageously high the price I asked," he says, "the more people were willing to pay."

systems or offer it directly as an option. When Wolfram suggested to Apple Computer that Mathematica be bundled with the Macintosh, he met with a frosty reception. Apple recommended that Wolfram approach Claris, the independent software company set up by Apple, but there he was given an even colder shoulder. According to Wolfram, the Claris executives did not even want to take a look at Mathematica. As a result, Wolfram Research is selling the Macintosh version of Mathematica directly and through several computer dealers affiliated with academic institutions. According to Wolfram, sales of the Macintosh version are currently "more than profitable."

Wolfram does not yet have an agreement with IBM for the PS/2 series of computers. In fact, Mathematica cannot run on MS-DOS machines because of their inability to address more than 640K of memory. However, Wolfram Research has an agreement with Autodesk, the Sausalito, California, developer of the very successful AutoCAD software package, to port Mathematica to IBM-compatible computers that will run the OS/2 operating system.

Although Wolfram will not comment officially, his company is said to be developing a version of Mathematica that will run on MS-DOS machines equipped with the Lotus/Intel/Microsoft Expanded Memory Specification and other DOS extenders. Wolfram Research may sell such a system directly, just as it currently does with the Mac version of the software.

Mathematica may also appear in several other guises. Autodesk has plans to create engineering programs that use Mathematica as a back-end processor, says Eric Lyons, director of technology for Autodesk. Among the applications will be a visual programming

language for use in computer-aided design. With such programs, the user will be largely unaware of the underlying mathematical processes and will not require the same degree of expertise needed to program directly with Mathematica itself. Wolfram anticipates that many third-party software developers will use Mathematica not only for engineering programs but also for other applications that require sophisticated mathematics routines, such as financial analysis.

Another large market for Mathematica will be education, says Wolfram. A calculus course based on Mathematica is being developed by Jerry Uhl, a professor of mathematics at the University of Illinois. The course will eventually be published by Addison-Wesley. "Almost a million students enroll in calculus courses every year," notes Wolfram. "That's a great market."

Wolfram is also attempting to make deals with several "major universities" to sell Mathematica with the Macintoshes they require students to buy through their college stores. "Rather than trying to sell a site license, we will offer schools copies of Mathematica for \$50 each for resale to each student who buys a Mac," says Wolfram. He expects to conclude at least three such arrangements by the end of this year.

Tough Act to Follow

Now that Mathematica is pretty much complete, Wolfram is devoting more and more of his time to making deals—a process he clearly enjoys. Although he first began his wheeling and dealing by suggesting arrangements that he felt were fair to both sides, he now admits to making tougher bargains. "I found out from consulting [with computer developers] that the more outrageously high the price I asked, the more people were willing to pay," he says, shaking his head in disbelief.

After all the Mathematica deals are made, what's next for Stephen Wolfram?

"People are always asking me what I will be doing for an encore," he says, "and I never know how to answer that question." He pauses for a moment, then adds: "I'm too impatient to go on with university research and sit on all those committees where hairs are continually split. I guess I'd like to make enough money to do my own independent research, perhaps on generalized pattern recognition systems using artificial intelligence techniques."

Would \$5 million be enough? "Well, that might be a start," he says.

Whatever Stephen Wolfram chooses to start, its scope clearly won't be small, and he'll inevitably do it his way. ■

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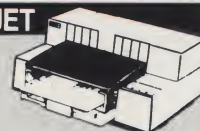
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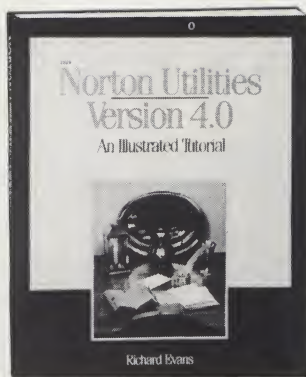
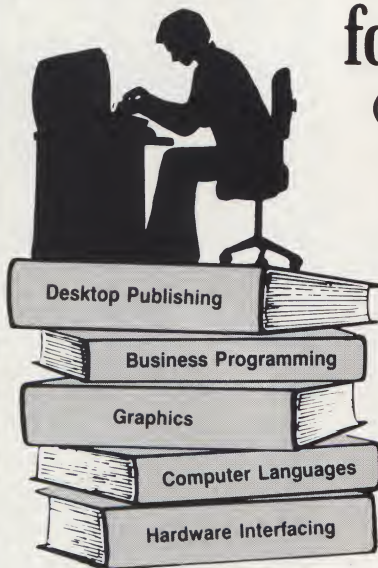
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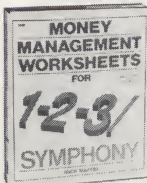
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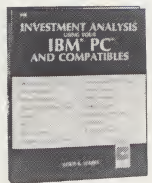
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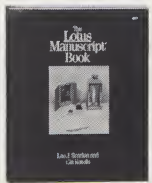
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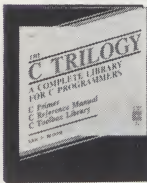
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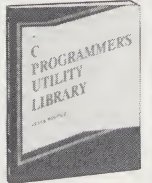
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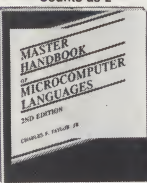
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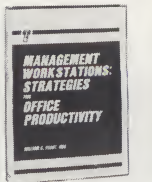
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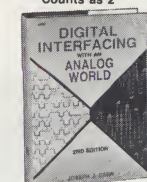
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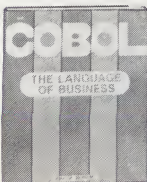
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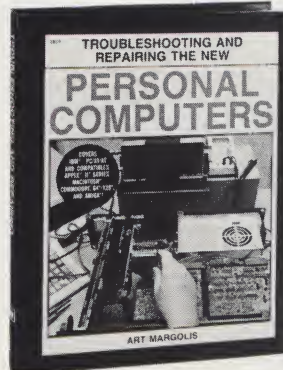
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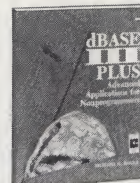
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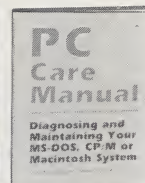
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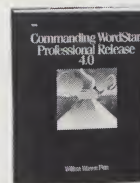
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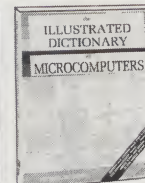
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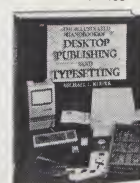
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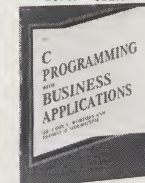
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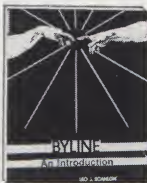
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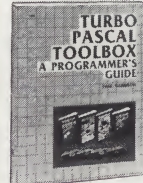
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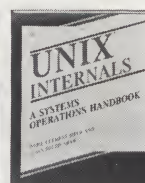
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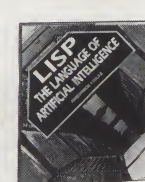
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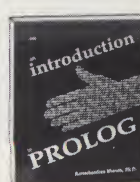
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CONNECT

By PETER H. LEWIS

Telex machines are the dinosaurs of the communications world—lumbering beasts with brains the size of walnuts, inevitably headed for extinction under the onslaught of fax machines, personal computers, telephones, private leased lines, and even Federal Express. According to communications analysts, the telex market is shrinking at a rate of 10 to 15 percent a year.

Even so, the sheer size of the remaining installed base—1.7 million subscribers—means that telex machines will still be chattering out messages for years to come, especially overseas.

Telex remains the international standard for communications, especially in financial markets and the travel industry. Most telex machines were installed in the bowels of companies back in the days when a data transmission rate of 50 baud (about as fast as a good typist) was considered racy.

The PC, on the other hand, operates at speeds from 300 to 1200 baud—about 10 times faster than telex, or more than 20 times faster with a 2400-baud modem.

How do we bring these two disparate worlds together? Quite easily, as it turns out. There are several handy ways to connect a personal computer to the international telex network. Subscribers to modern electronic mail services such as CompuServe, MCI Mail, and AT&T Mail can send and receive telex messages with relative ease.

Depending on the e-mail service used as a gateway, sending a telex can be as simple as choosing a menu item onscreen. In some cases, the user may have to put the word *telex* in parentheses on the address line. Check with your e-mail service to determine the proper procedure.

Telex machines can receive messages only when they are turned on, and that creates a problem in companies or countries where the machines are turned off at night to save electricity. If you're trying to send a telex to India at noon eastern daylight time, it's already 10:30 P.M. in New Delhi, and the telex swamis have gone home.

Using the store-and-forward facilities of electronic mail, however, a message can be sent from a PC to an international record carrier such as MCI/Western Union International, RCA Global Communications, TRT Telecommunications, or ITT World Communications, all of which operate the telex system in this country and connect with telex services elsewhere. If there's no response from the receiving machine when a message is sent, the sender keeps trying for as long as the customer desires—whether it's 20 minutes or 20 hours—until the message gets through. Or, if a response is not received, a "cancel" message is sent back to the sender's in-box

to inform him that nobody is home.

The hardest part about sending a telex message through one of the private e-mail systems is finding the correct telex addresses and answerback codes. (An answerback code is a special set of characters that confirms that the message is going to the correct receiving

If you can't reach out and touch, phone, e-mail, or fax someone, try a PC-to-telex transmission.

telex machine.) Unfortunately, there is no online directory of telex addresses, though a variety of printed telex directories is available. They cost \$50 to \$500, prices that will test your enthusiasm for sending telexes, and are available from companies such as Jaeger & Waldmann (516-433-6767) and Green Continental (916-345-7599). Because there are so many telex addresses around the world, directories are often broken down into alphabetized sets by country or by continent (say, A to H in the United States).

Sorting out telex addresses and answerback codes is a labyrinthine process. A good discussion of telex addressing and answerbacks can be found in *The Complete MCI Mail Handbook*, by Stephen Manes (Bantam Books).

Once you find the right addresses, creating and sending a telex message is straightforward. Telex imposes a limit of 69 characters per line, which means that users accustomed to working with 80 characters will have to reformat their messages.

Because of the limited 5-bit Baudot code, punctuation on telex is a problem; for instance, telex cannot recognize semicolons, exclamation points, quotation marks, underlining, or other



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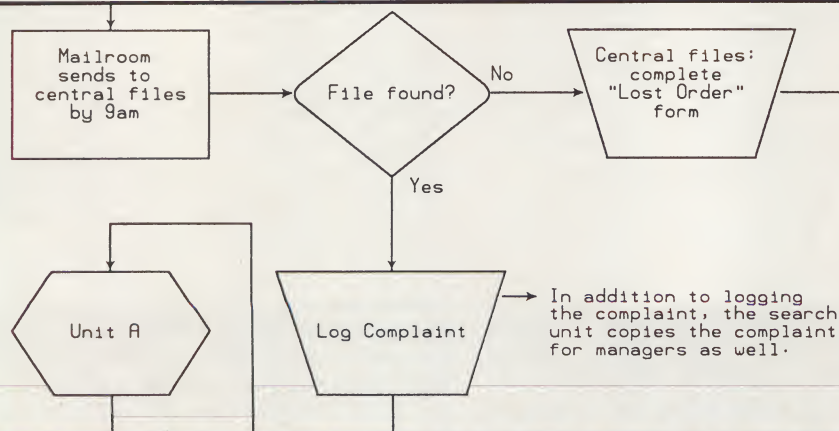
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CONNECT

second-tier marks. Periods, commas, question marks, and colons are acceptable. Many of the electronic mail services will automatically translate your characters to uppercase and your punctuation to symbols that telex can comprehend. Conversely, your personal computer will have no trouble reading the limited character set used by your telex correspondents.

Another problem is that telex machines cannot handle documents longer than 100,000 characters, or roughly 15,000 words. If you're planning to send a long telex document, perhaps a

PCs make telex more tolerable, but it's still a dinosaur.

draft of your novel or memoirs, it makes sense to break it up into two separate transmissions, adding the "more to come" and "first add" advisories to clue the recipient.

An advantage of subscribing to MCI Mail or AT&T Mail is optional software that automates the telex process. MCI Mail's CommDesk Manager, for example, allows you to send and receive telex messages in the background while you work undisturbed on another application. It can even check your in-box automatically at specified times and notify you if an e-mail or telex message is waiting.

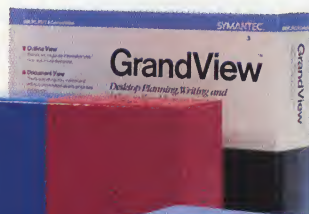
With AT&T Mail's software, you can create a distribution list that includes recipients' addresses. That cuts down on errors in typing long addresses and answerback codes for each transmission. Furthermore, with an option called Mail Talk, AT&T Mail users can gain access to their telex and other e-mail messages without a computer, which is handy when traveling. By dialing a number from a Touch-Tone phone, subscribers can have a computer-synthesized voice read their messages to them.

PCs make telex more tolerable, but it's easy to see why customers are switching to faster media whenever possible. Telex still charges the sender by the minute and moves at a lethargic rate. The PC has created a new climate for telecommunication, and it's killing off the dinosaurs. ■

Peter H. Lewis is a columnist for the New York Times.

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SHARE

By DEBORAH ASBRAND

Late last year, Datastorm Technologies enthusiastically put the final touches on an \$86,000 publicity campaign to launch its first retail product, ProComm Plus. As the ads—displaying a soft-focus photo of a dewy-eyed young woman—began appearing in computer magazines across the country, copies of ProComm Plus, accompanied by bags of coffee beans, mugs, and an invitation to sit down, relax, and review the program, began showing up on the desks of the editors of those very same publications.

It all seemed a bit Madison Avenue for a company that had gotten its start with a shareware product just two years earlier, but the campaign succeeded. ProComm Plus garnered attention in the computer press with its unusual ad, its snappy promotion, and, yes, its quality programming. Its introduction earned headlines, and its code won rave reviews.

The showy introduction Datastorm gave its new communications program left little doubt about where the company was pointed: toward mainstream commercial success.

Datastorm's firstborn, ProComm, a communications program distributed over bulletin boards, emerged as a shareware prodigy shortly after its birth in August 1985. Some 55,000 individuals downloaded it, tried it, and liked it enough to send in \$50 for registration and support. Business orders for site licenses poured in, and before long ProComm's sales were besting those of some retail communications programs.



That couldn't have made Datastorm founders Bruce Barkelew, Tom Smith, and Stephen Monaco happier. From the start they had envisioned Datastorm as a retail contender, and ProComm's success gave them the leverage they needed. As ProComm's star continued to rise in the shareware community, the Datastorm team set to work on ProComm Plus. Fifteen months later, Plus was ready—but it wasn't shareware. Datastorm priced it slightly higher than ProComm (but at a still-modest \$75) and released it through retail outlets to a public they expected would embrace the upgraded program with the same enthusiasm the earlier version had enjoyed.

The public was excited, all right, but hardly enthusiastic. Letters, telephone calls, and bulletin board messages to Datastorm's Columbia, Missouri, offices indicated that shareware fans and bulletin board writers had been anticipating ProComm Plus for months. Now they were chastising Datastorm for distributing the product through retail

channels. "We supported you way back when," one bulletin board message read, "and now look what you've done."

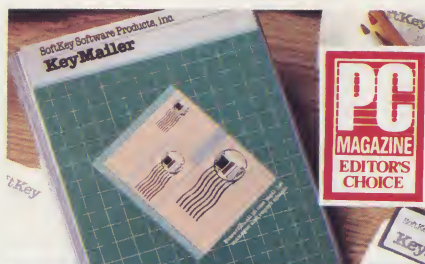
Datastorm wasn't the first shareware company to cross the retail line. In 1985, ButtonWare, Inc., of Bellevue, Washington, released PC-File/R as a retail version of its immensely popular shareware database, PC-File. After 18 months, though, CEO Jim Button, one of the first and most successful distributors of shareware, abandoned his ambition of mar-

keting PC-File/R as a retail product. "Rumors started that Jim Button no longer liked shareware, and that caused a lot of bad PR and bad feelings," Button says. He withdrew PC-File/R and combined features from it and from

Shareware writers seek fame and fortune in the retail market. Can they make it? Should they even try?

PC-File into a new shareware program, PC-File Plus.

Even Andrew Fluegelman, the acknowledged founder of the shareware concept, apparently planned at one point to venture into retail with a version of his popular shareware communications program, PC Talk III. In 1982, Fluegelman uploaded PC Talk III onto bulletin boards along with the then-unusual request that users who



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SHARE

liked the program show their support by paying for it and passing it—as well as the request for payment—on to other PC enthusiasts.

PC Talk III's success fueled the growth of Fluegelman's company, the Headlands Communications Corporation of Tiburon, California. Fluegelman began rewriting the program and, among shareware authors, discussed his plans to sell the new product, PC Talk IV, through retail channels. Fluegelman died before PC Talk IV was released, but Headlands did distribute it to retail outlets after his death. Jack Butler, the chairman of Headlands, which still owns the rights to PC Talk III and IV, estimates that the two packages have been distributed to 800,000 users.

Despite the disappointment that runs through the shareware community when popular products go retail, shareware programs are commercial products. Their distribution method is a bit unorthodox—more like bartering among friends than buying from strangers—and shareware does provide users and programmers with much-needed alternatives to higher-priced retail products. But shareware isn't, and was never intended to be, free for the taking. A money-for-product exchange is assumed.

Nevertheless, shareware brings an emotional bond to the user-vendor relationship that the retail market generally lacks. "Half of the people who use shareware view it as a marketing tool; the other half view it as a state of mind," says Marc Adler, author of the shareware word processing program New York Word. "It revolves around the whole bulletin board community, which is a fraternal organization."

Bulletin boards were, and in many cases still are, the electronic equivalent of the neighborhood bar, a place where friendships are formed and weighty problems resolved. In a forum where discussions and debates touch on everything from the rising cost of DRAM chips to the relative merits of baseball teams and brands of beer, a shareware company's shift into retail can be as wrenching an experience as a best friend's moving to a distant city. To many shareware users, Datastorm, like Headlands and ButtonWare before it, had broken the bonds of brotherhood.

In reality, however, it's the users, far more than the vendors, who breach the faith of shareware. The honor system, shareware's marketing vehicle, invites freeloaders. Shareware programmers

estimate that they collect fees from only 1 to 5 percent of those who routinely use their programs. Six months after its release as a retail product, ProComm Plus had already generated more orders than ProComm's total number of registered users after almost three years in the shareware arena.

The real underwriters of shareware are the businesses that purchase site li-

One shareware programmer designed his software to shut down after a certain number of uses. Registration shot up by 650 percent.

censes. Marshall Magee, author of Automenu, a menuing utility, estimates that corporate users account for 90 percent of his company's \$1 million in revenue. And Stephen Monaco, Datastorm's vice president for marketing, estimates that at least 400 companies have bought site licenses for ProComm. Within those companies, users may number into the thousands. Pacific Gas & Electric, for example, sprung for a \$17,500 unlimited license to put ProComm into the hands of 3,400 employees.

"Corporations are more likely to license their copies because they stand at more risk," says Monaco. "If John Doe downloads a copy and never pays for it, how will we ever know? Companies, though, have a lot more to lose." Corporations simply do not want to risk the legal disputes and damaging publicity that could follow a revelation that they are using illegal copies.

Shareware programmers have traditionally encouraged registration by offering technical support and program manuals to registered users only. Recently, however, a number have begun to use programming tricks to encourage registration. For example, some programs are uploaded to bulletin boards minus useful chunks of their applications, which the companies will forward only to users who register.

Shareware programmer Paul Meiners used a different tactic: he rewrote his GT Power communications program to shut down after a specified number of uses. One month later, registration receipts shot up 650 percent.

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Shareware is catching on! Individuals, companies and colleges across the nation have discovered this new concept of "try-before-you-buy" software. Companies and institutions such as AT&T, Harvard University, Atlantic Richfield, Chase Manhattan, Dean Witter, and Ford Motor all use Shareware products.

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Title	PC-SIG Disk#	Comment
1 EDRAW	#828	Best seller for 24 weeks! "Draw schematics, flowcharts---even printed circuit boards. Req. color"
2 AutoMenu	#608	2nd best seller for 16 weeks! "Make your own easy access menus to run programs"
3 Sidewriter	#523	"Print banners or long spreadsheets sideways"
4 EZ-Form Package	#404	"Business forms ready to be used or changed to fit your needs"
5 PC-File+	#5, #730, #1015	"Jim Button's popular data base"
6 HGCIBM	#870	"Lets your Hercules card run many color (CGA) programs"
7 Greatest Arcade Games	#457	"Donkeykong, Flightmare, Spacewar and more! Color required."
8 Qube-Calc	#696	"Lotus compatible 3-D spreadsheet"
9 Patrick's Best Games	#476	"3-D Packman, Castle, Spacevad, etc.. Some require color."
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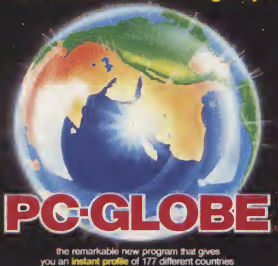
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"The art is to annoy them, but not drive them away," says Meiners. In hindsight, he believes the usage-count scheme was a bit harsh, and he abandoned it last May in favor of what he calls a progressive delay: GT Power takes two-tenths of a second longer to start each time it's loaded. After 500 starts, a full minute passes before the screen activates.

As shareware moves into retail markets, programs that once were distributed free on bulletin boards are appearing as shareware. That trend, too, alarms shareware aficionados. Shareware etiquette holds that only authors of full-blown applications should seek fees, but more and more compact utilities are showing up on bulletin boards as shareware.

Utility authors aren't the only offenders. Shareware enthusiasts report that a growing number of programmers

Shareware writers with retail ambitions face an uphill battle: competition for scarce shelf space.

suspiciously issue new versions every couple of months—a clear indication, the enthusiasts say, that some program writers are rushing into the shareware market with programs that haven't yet been properly tested.

"Today, if a programmer comes up with a useful program, he decides he can make some money off of it," laments Button. "I call it what-the-heckware."

But it's little wonder that program authors dazzled by the success of companies such as Datastorm and ButtonWare want to follow their lead. Would-be entrepreneurs see shareware distribution as a way of gauging the popularity of programs before they attempt expensive forays into retail channels.

That approach paid off handsomely for Datastorm. And even if ButtonWare fared less well, it enjoys substantial standing as a shareware company and has succeeded in distributing its shareware products in a number of retail outlets. Button says that some 1,500 dealers carry ButtonWare products.

Seattle-based Quicksoft has achieved similar success. Its popular shareware

word processing program, PC-Write, competes on Egghead Discount Software's shelves with a number of purely retail products. Quicksoft founder Bob Wallace began as the proverbial traveling salesman in 1983, selling PC-Write for \$10 a copy at regional computer fairs. Today he asks little more, just \$16, and offers a manual for another \$35. If you want the whole package—disks, manual, technical support, and a subscription to Quicksoft's newsletter—it's yours for \$89, the same price it sells for at most retail outlets. Wallace attributes as much as 15 percent of PC-Write sales to the retail world.

But shareware authors with retail ambitions still face an uphill battle: competition for shelf space. Thousands of software titles elbow for consumers' attention, and retailers remain skeptical that shareware—whose sales are more often generated by word of mouth than by advertising and promotion—will move quickly off their shelves.

Despite ProComm's reputation as a best-selling communications program, Datastorm's Monaco says the company encountered tremendous resistance when it approached distributors with ProComm Plus. "Getting into the retail networks took a lot of patience and perseverance," he says. "It took a while to change retailers' attitudes."

Last year, shareware authors formed the Association of Shareware Professionals, a support organization. The ASP strives to impress on users the difference between shareware and free (public domain) programs, and it encourages disk vendors that advertise shareware products as low-cost software to mention in their ads and publicity materials that the programs are indeed shareware. The ASP also plans to assemble an information packet for prospective shareware authors, who at present have no resources to turn to for advice and assistance in starting companies.

Although there is more concern for the bottom line in the shareware community these days, the "try-it, if-you-like-it-then-pay-me" approach isn't about to disappear. There are many in the business, such as Quicksoft's Wallace, who are committed to keeping the share in shareware. "It's important to make money," Wallace says, "but I also like having a lot of people benefit from the software." ■

Deborah Asbrand is an associate editor of PC/Computing.

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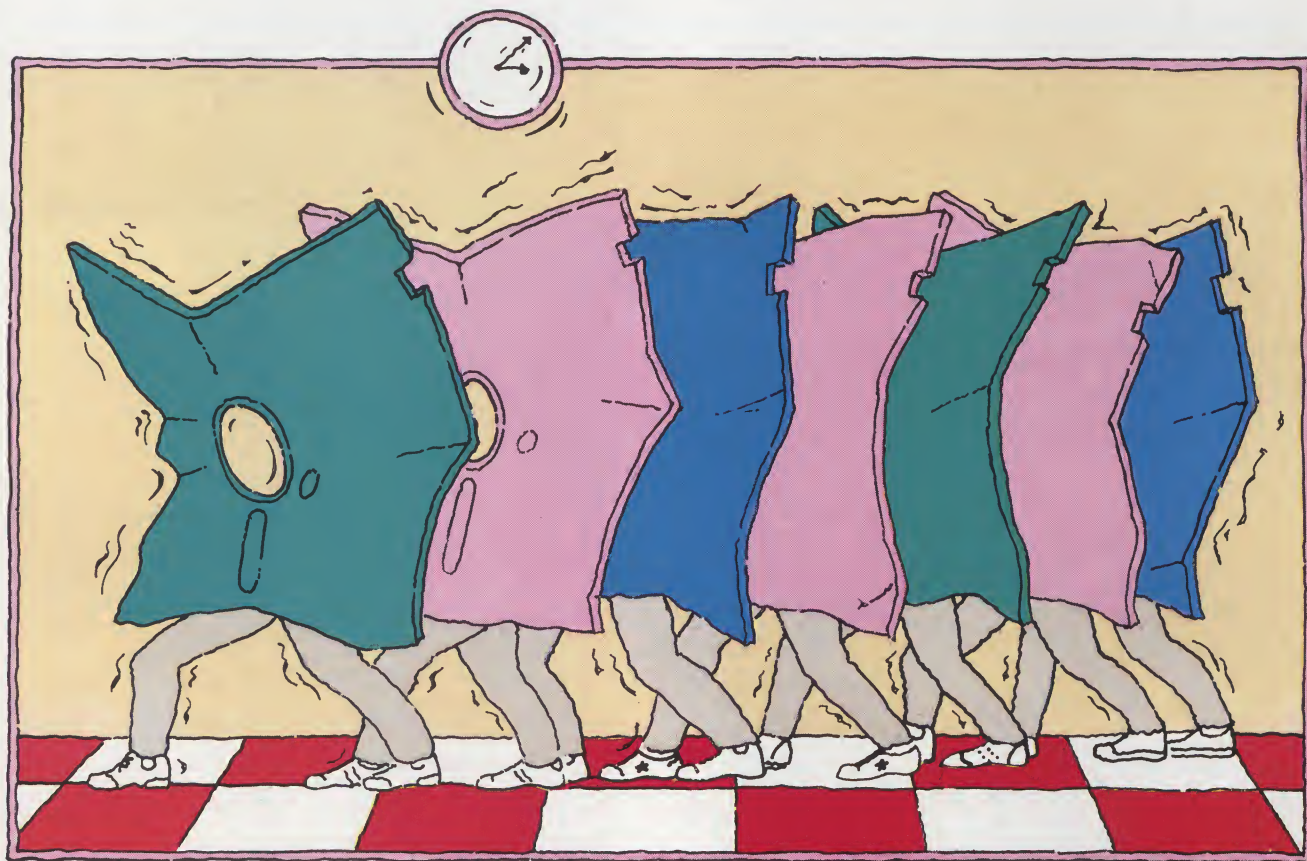
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ASIATECH

By ANNA FORTIG

IBM Japan—known as Kamisama, or god, to some Japanese—may rule the mainframe universe, but NEC is the sovereign of the Japanese PC market.

The NEC Corporation has a commanding 50 percent share of the personal computer market in Japan; with more than one million installations, its PC9800 series dominates the business PC market. IBM Japan, in contrast, holds a paltry 7 percent share, trailing Fujitsu, which controls 15 percent.

It is a situation that mocks IBM's success in the United States, where the PC's open architecture and resulting third-party hardware and software support have created a unified and standard microcomputer marketplace. In Japan, IBM came late to the game: not until 1983, by which time NEC had already secured 23 percent of the market, did it offer a personal computer that would run Japanese software. And that machine, the IBM 5500, not only was incompatible with IBM's PCs in the States but also had very little software available for it—especially in comparison with the 5,000 programs that ran on NEC's popular PC9800.

Japanese computer makers realized that if they were to chip away at NEC's market share and expand the market in their country, they needed to capitalize on the volumes of software available for the AT and compatibles in the United States. So about two years ago several firms independently approached Microsoft, Ltd., in Tokyo and asked for help in adapting for Japanese use the AT-compatible products they were developing for the U.S. market.

Soon, according to Microsoft spokes-

man Tetsu Etoh, these manufacturers realized that if each made its own AT compatible, the result would be a group of incompatible compatibles that wouldn't be able to compete effectively against NEC. Their solution was to band together to develop a bilingual AT-compatible standard for Japan

cial AX functions), and support both 5¼- and 3½-inch disk drives.

A number of AX products are already beginning to appear. Acer, Sanyo Electric, and Sharp are offering desktop computers, and Mitsubishi Electric has a laptop model. Mitsubishi also plans to produce a desktop model, and Sanyo,



If a consortium of Japanese manufacturers gets its way, your next PC may be bilingual.

Sharp, AI Electronics, and Oki Electric say they may begin to manufacture portables this fall. In addition, Acer will pack extra features, including high-resolution displays and large storage systems, into high-end models that will go for as much as \$15,100.

called AX, for Architecture Extended.

A nonpartisan AX committee was set up in October 1987 to wade through standardization proposals. Initially a group of 19 companies, the consortium has since swelled to 150 members, including such subsidiaries of U.S. firms as Microsoft and Nippon Data General, and Taiwan's Acer Japan Corporation.

The committee has now set most of the specifications for the AX computer. Systems based on the standard will use 80286 or 80386 processors, offer displays that run in both an EGA-compatible graphics mode for English text and a higher-resolution mode for Japanese kanji ideographs, include printers that contain read-only memory for kanji, have 105-key keyboards (the four extra keys are for kanji conversion and spe-

Other manufacturers involved in the standardization effort are making parts or developing programs that group members can purchase. For example, the ASCII Corporation is designing a custom graphics chip for kanji characters, Alps Electric a bilingual keyboard, and Seiko Epson a printer. Microsoft will supply the bilingual DOS, and the Softbank Research Institute is adapting for Japanese use the basic input/output system (BIOS) that it distributes for Phoenix Technologies of Norwood, Massachusetts, a major supplier of BIOS products for makers of compatibles worldwide.

How strong is the AX standard, and how committed to it are Japanese computer manufacturers? Very strong and very committed, says Hajime Sugie of the personal computer division of Mit-

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ASIATECH

subishi. "They saw failures or unhappy cases in the past, so they will not deviate from the standard," he says. "They will add value to it."

In fact, Sanyo is now studying the feasibility of exporting AX machines to Europe and North America. "AX is the first strong step taken by Japanese companies to compete with the IBM PC," says Sanyo spokeswoman Kumiko Makino.

There also is a budding market for exported AX components, such as keyboards, monitors, and main system boards, to be fit to existing ATs and compatibles in the United States, says Makoto Sumiura, a member of the AX committee.

But Mitsubishi's Sugie believes the U.S. tariff on electronics products will initially keep a lid on AX exports to the United States. Still, he sees a demand in this country for these machines. "Business is becoming one worldwide market," he says, "and multinational companies will opt for one personal computer that can be used globally—especially securities companies and banks."

Despite the consortium members' enthusiasm, at least one computer user says the AX personal computer may be the right product at the wrong time.

Charles F. Cronheim, director of Mobil Sekiyu Kabushiki Kaisha's information systems department, which uses IBM 5500 series machines, IBM Japan PS/55s (PS/2s), and a few English-language IBM PCs says: "One of our biggest problems used to be that the 5500 was incompatible with the U.S. machines. If the AX had come out five or six years ago, it might have been a smashing winner." And he questions whether English-language software will be of much use to PC users in Japan outside of big corporations.

Still, Cronheim sees a strong latent demand for the machines outside Japan. "I suspect there is a big untapped market for overseas arms of Japanese companies that need to communicate with Japan," he says.

In addition, as Cronheim observes, more people worldwide now understand that to deal with the Japanese, one must speak Japanese. "So machines like this are likely to have a future, but not an immediate one," he says. "I would imagine that in ten years you will find all PCs are bilingual." ■

Anna Fortig is a correspondent living in Tokyo.

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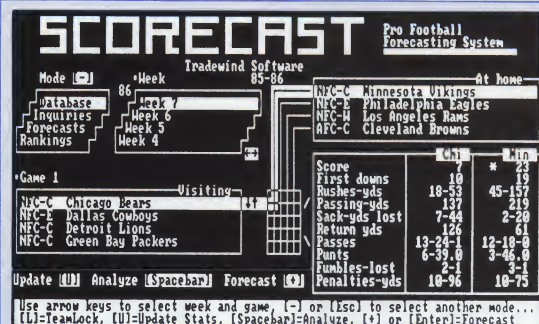
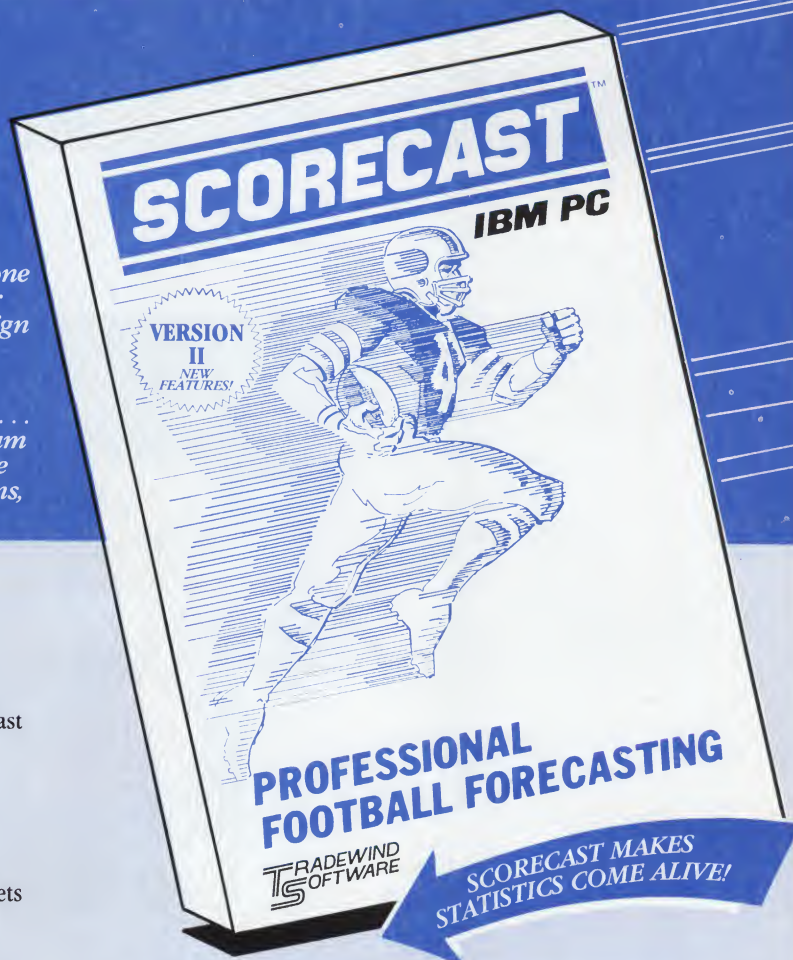
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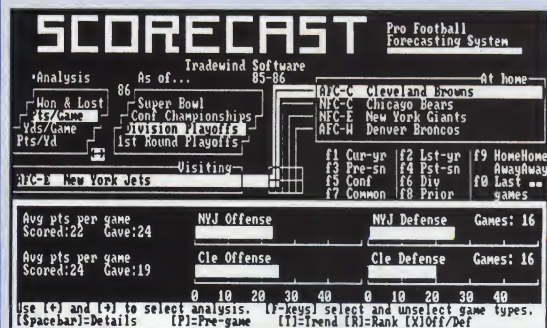
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Consider this: How many Pixie menu selections does it take to create a complete bar chart – with annotation, axes, title, and legend? Just *one*.

How many menu selections are needed to change the bar values? Add to the title? Change the axis scaling? Add more bars? Would you believe... *none*.

Zenographics introduces Pixie, a new charting and drawing program with the simplest, most obvious user interface yet devised for presentation graphics.

In technical terms, it's called *direct manipulation*. To you, it means *instant learning* – and because it's so visual, Pixie is one program you'll never forget how to use.

Based on Microsoft® Windows, we think Pixie is the best example yet, in any software category, of the power of the graphical user interface.

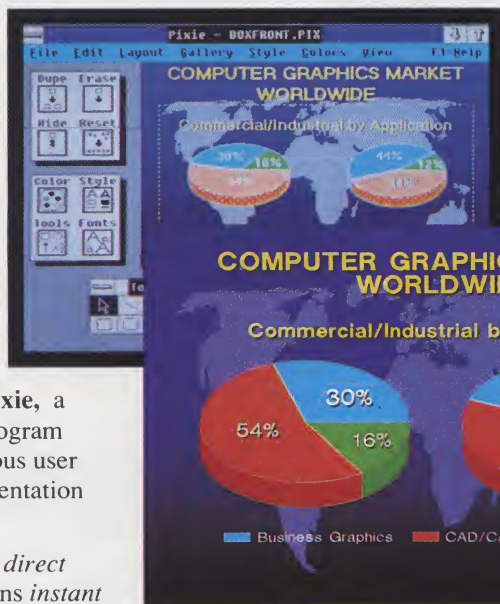
Deep down, you know why you invest in graphics: you want to look good. You want to impress, to entertain, to inform, to *sell*.

Pixie can make you look good. Just because it's simple doesn't mean it isn't beautiful – great color, shaded backgrounds, clean typefaces, drop shadows, 3-D effects, and more.

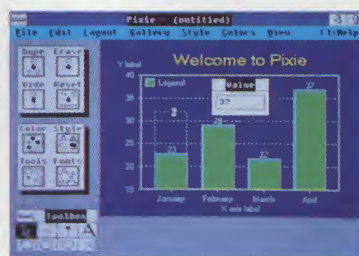
Take a look at the slide on the left. Does it look like it could be created by a graphics amateur? In 10 minutes? With a \$195 graphics package? Thousands of Pixie users are making this very image: it's Lesson 3 (just six pages) in the Pixie manual!

Pixie is Zenographics' newest winner. It connects

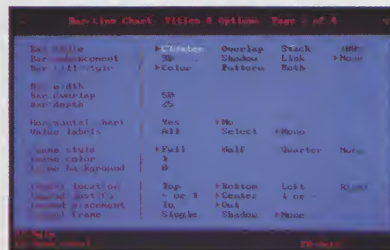
beautifully with our flagship product **Mirage** – the PC-based tool of choice for graphics professionals. Through Mirage, Pixie gains access to the best and most complete output device drivers, and to the artistic expertise of thousands of Mirage power-users worldwide.



	Pixie	Harvard Graphics	Freelance Plus
Graphical user interface?	Yes (MS Windows)	No	No
User interface technique	Direct manipulation	Fill-in forms	Fill-in forms
Editing preserved if chart changes?	Yes	No	No
Screen Fonts	Windows, Bitstream, Mirage	Helv, 1 hardware font	Stick
Maximum colors per image	16 million (Windows limit)	16	12
Compatible with professional systems?	Yes (Mirage)	No	No
Price	\$195	\$495	\$495



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Their form



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TOOLKIT

By **BILL HOWARD**

The tools you reach for most often at home are a hammer and a screwdriver. But when you're faced with an unusual job, you're glad you also have snap-ring pliers, an electronic stud finder, and a miter box—special tools for special purposes.

Organization charting programs are the snap-ring pliers of PC software: you don't use them every day, and they're good for only one special task. You could get the job done eventually with a generic tool—but why should you? Your time is worth more than what one of these programs costs, and nothing else does the job as thoroughly or efficiently.

Spend half an hour with a program

like Org Plus, and you can crank out a crisp visual representation of who works for whom in a 30-person department. That's a mixed blessing: overuse of organization charts can be one symptom of a company hung up on management by memo. But org charts also give you a quick fix on where a new or transferred employee fits in, in a way that a flat file of names, titles, and phone extensions never can. Org charts also explain the structure of your workgroup or department graphically to your VP. And if your regular receptionist is out sick, the visual nature of an organization chart (with a phone extension under each name) makes it easy for a temp to direct calls.

the manner of the First Corollary of Home and Auto Repair: When your hands are holding together two reluctant pieces that are poised to spring apart, *anything* within arm's reach can and will be used to fasten them to-

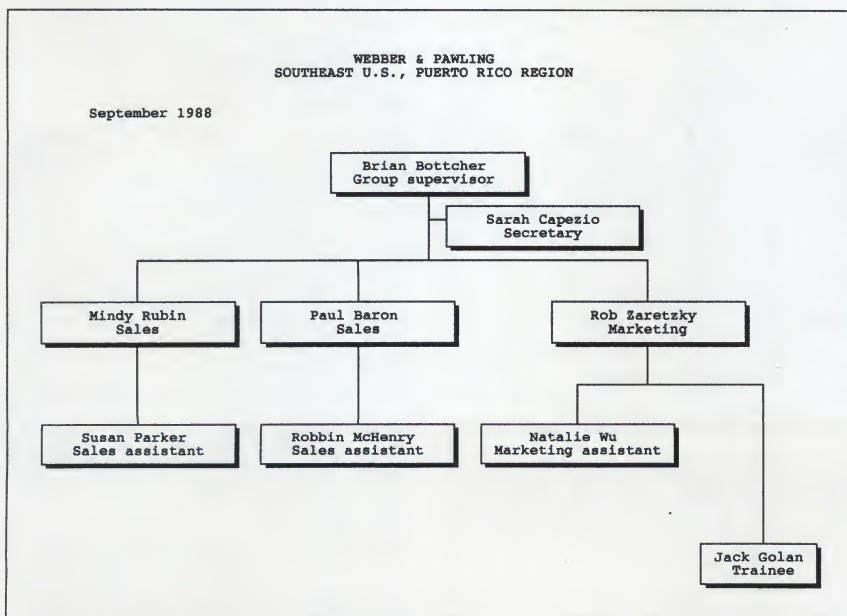
**Why do organization charts the hard way?
Org Plus is the right tool for the job.**

gether. So you adapted word processors and spreadsheets, making heavy use of the vertical bar and hyphen keys as line-drawing tools. It was a slow, awkward process, but it worked—sort of.

Graphics software also worked, sort of. When you weren't using AutoCAD to draft building plans, you could use it to craft org charts (you could represent almost one floor's worth of the Pentagon's staff on an E-size plotter print); the only problems were slow speed and a \$2,850 price tag. Paint programs were closer to the mark, provided you could get the names centered in the boxes, align the boxes evenly within the rows, and not overshoot your connecting lines. In other words, you had to have an artist's touch.

Org Plus, a single-purpose, \$79.95 organization charting utility from Banner Blue Software, just about idiot-proofs the process. You enter names and titles, usually starting with the top gun and working your way down. Org Plus automatically creates all the boxes and connecting lines, and it lets you choose how the output will look: single- or double-border boxes, perspective shadows under the boxes, and your choice of several horizontal or vertical arrangements *for the names at the lowest tier*.

For each person on the chart, you can enter six lines of 25 characters each for names, job titles, and comments.



Organization charts are a great idea—unless you're the one assigned to borrow a T-square and draw the boxes and lines. Org Plus produces crisp drafts and includes finishing touches like drop shadows.

Before PCs, you had to use a straightedge and a pen to finish off org charts begun on a Selectric. Or you just did without. Then came PC software that wasn't intended or suited for org charting—but you made do with it, in



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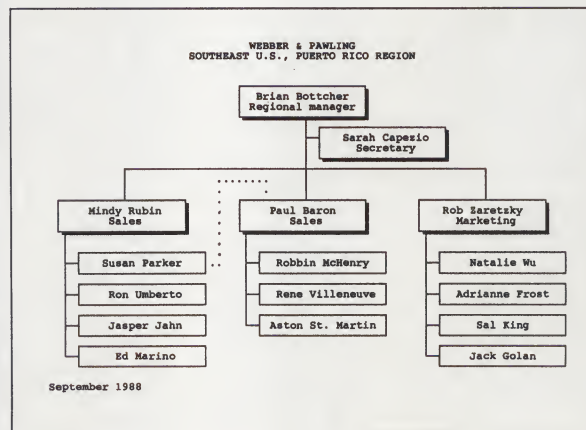
TOOLKIT

You choose which lines you want to print. If you have too many names to fit on a page, Org Plus will try to shrink the chart by removing spaces between boxes or using compressed type (on a laser or dot matrix printer); if that doesn't work, the chart spills over onto multiple pages, which you can tape together. (Org Plus supports Sideways, a dot matrix printing utility from Funk Software that does just what its name implies—often a necessity with charts. Sideways is another worthy addition to your PC utility tool chest.)

grasp but more limited in its features. It's \$79.95, too.

The biggest competition for Org Plus comes from presentation graphics programs. Most of the major players and some of the others have org chart modules, including the top two sellers: Harvard Graphics, \$495 from the Software Publishing Corporation, and Freelance Plus, \$495 from the Lotus Development Corporation.

Harvard, the best all-around graphics program, offers two pluses and one big minus compared with Org Plus. Har-



The dotted line from Susan Parker to Paul Baron indicates that she assists Baron as well as Mindy Rubin. It also points out one of Org Plus's weaknesses: logic dictates that if Parker works for Baron, the dotted line should connect to the bottom of his box on the chart, not to the top.

You get another six lines in Org Plus for financial information, which might be salary, sales, or commissions, and you can calculate totals and averages across levels or up and down workgroups. While Lotus 1-2-3 is in no immediate danger from Org Plus, some users will find the program's calculation tools handy for seeing how workgroups stack up. The screen display of the money amounts can be toggled off, but files are not password-protected—a drawback.

The program has been available since 1985, and each iteration has added a few features. The current version adds a tabular reports option (the output looks like a listing from a traditional database or spreadsheet). You'd use it for sales or salary summaries, or to create an internal phone book that shows names, titles, and phone numbers but not the visual rendering of the pecking order. An advanced version, due this fall, will add a freehand drawing module for line-and-text annotation; the price will be \$129.95.

Org Plus has one standalone competitor: Terrific! Organization Chart Maker from KD Systems in Raleigh, North Carolina. Terrific is slightly easier to

ward creates its own fonts on the fly (including proportionally spaced fonts, so you get more names on a single page), and you can have different fonts and sizes for chart titles, employee names, and employee titles. Harvard supports film recorders, the devices used to make presentation-quality slides, while Org Plus is limited to fixed-pitch output from printers and plotters. You can make Org Plus overhead transparencies on a laser printer (stick a sheet of clear acetate in the manual feed tray), but the characters will be too tiny to read. Harvard Graphics' drawback is that it isn't very robust as an org chart maker: chart types are limited, and you get one name, one title, and one comment per person. Still, Harvard may be enough for many users.

For that matter, Org Plus isn't without its foibles. For instance, even if you have a graphics monitor, you can't see the finished chart onscreen in its entirety—just one-character-wide blinking squares. (You can print to disk and then view the disk file, but that's no faster than using a laser or fast dot matrix printer. And viewing big charts onscreen is like reading a road map from half an inch away.)

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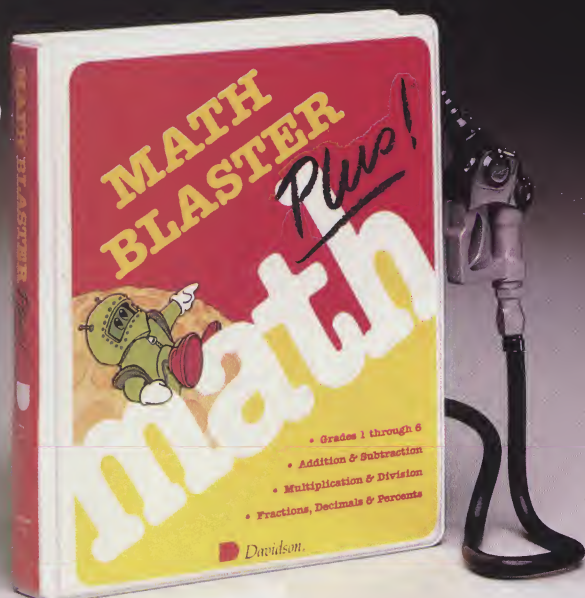
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TOOLKIT

Another shortcoming of Org Plus is that you'll need workarounds to deal with unusual hierarchies. Org Plus works better if your organizational complexity approaches the level of "me Tarzan, you Jane." If an executive secretary (a staff-level position) has an as-

Org Plus works better if your organization is about as complex as "me Tarzan, you Jane."

sistant (another staff position), or if two people comanage a department, you've got problems. Ditto for a long name like Priscilla Fitzgibbon-Zaretsky, because there's no easy way to break it into two lines, or to abbreviate the first name automatically.

Warts and all, an org charting package belongs in the toolkit of every savvy PC user. And once you've used one for its intended purpose, you may find other uses, such as making tree diagrams for engineering work, preparing bills of materials or parts-cost rollups (using the math features), or even diagramming a family tree.

Check your graphics program for an org charting module, or take a stab at making a chart from scratch with a paint or drawing program. Each will work up to a point, but eventually you'll find it pays to have a well-stocked tool chest. Odds are you'll have a place for the likes of Org Plus. ■

Bill Howard is an executive editor of PC Magazine.

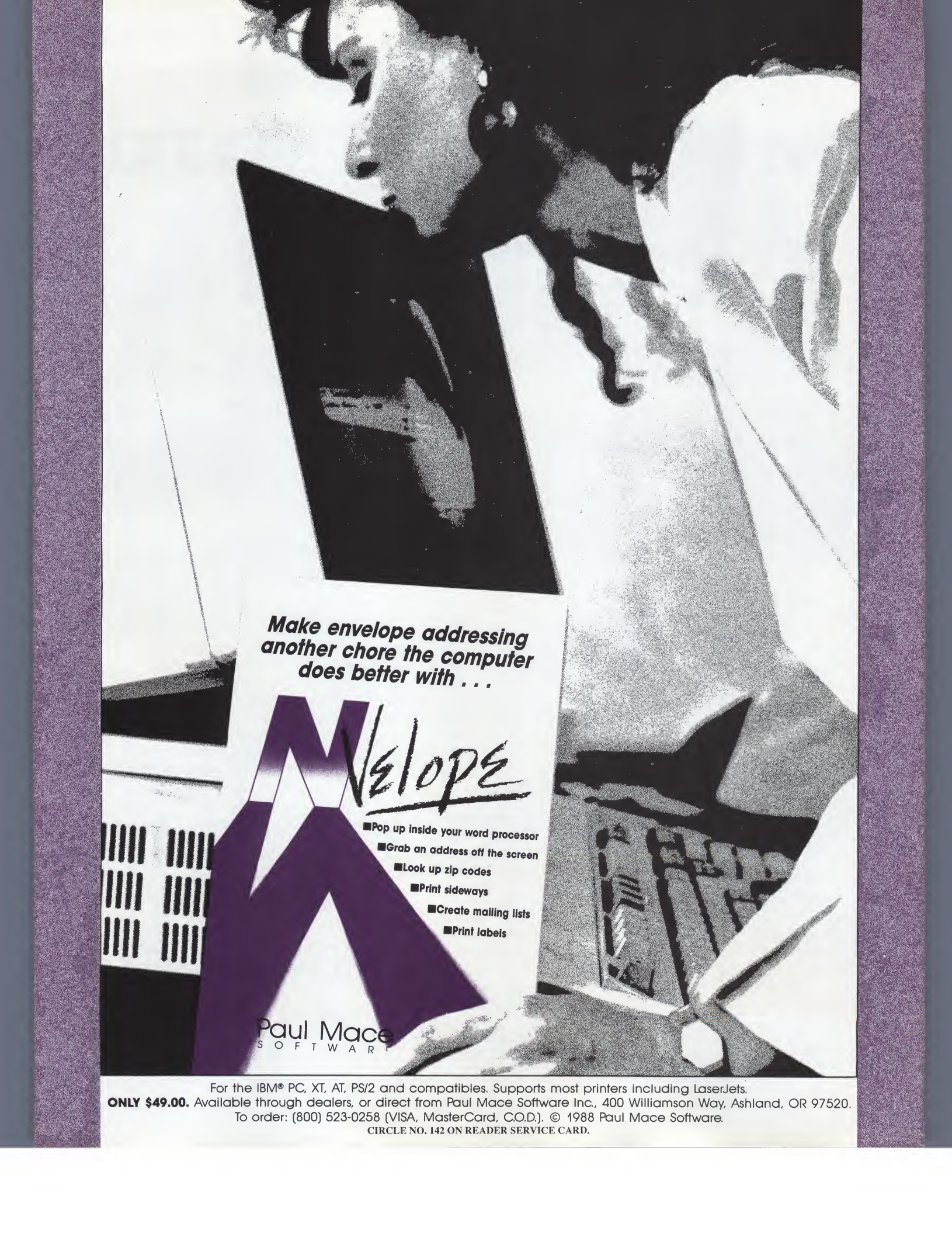
Org Plus Version 3.0

List Price: \$79.95

Requires: 320K RAM, printer, DOS 2.0 or later.

In Short: A competent single-purpose tool for creating organization charts. Not perfect, but better than org chart modules in most graphics programs and the best of a very small group of org charting programs. Not copy protected.

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A black and white photograph of a woman with dark hair, wearing a light-colored top, looking intently at a computer monitor. The monitor displays a dark image with some light-colored shapes. The woman's face is in profile, and she appears to be focused on the screen. The background is dark and out of focus.

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MEDIA

By CAROL OLSEN DAY

High-tech companies, their advertising agencies, and the print ads and television commercials they produce are not only in the spotlight these days, they're charged with all the tension of an unfolding drama.

Ten years ago, the most popular stock photos were romantic soft-focus mood shots and travel pictures. Today's favorites show high-tech industrial scenes and business computers, according to Mark Daniel of New York's Comstock stock photo house.

It's no wonder. If you can believe the aging yuppies featured in many television commercials for computer systems (and the companies and ad agencies behind them), computers are now the stuff that dramas are made of.

Sometimes the drama in a television ad is a tense confrontation à la *Wall Street* (AT&T version); sometimes it's a slapdash *M*A*S*H* reunion (IBM version); sometimes it's somewhere between these extremes (hypothetical Hewlett-Packard, solid Compaq, jargon-spouting Wang). And sometimes, as in Apple's ads, it's "different."

No matter which computer company has the starring role, though, the basic story is the same. It's a story about the coming of age of the baby-boom generation, about technology, about money and power. It's a story about the last days of the 1980s.

The familiar slogans—tag lines to print advertising and television commercials—say little:

"IBM. The bigger picture."

"AT&T. The right choice."

"Wang makes it work."

Hewlett-Packard's "What if...?"

Apple's "We're different," "The power to be your best," and "You did that with a computer?"

Compaq's "It simply works better."

But the scenes that precede some of these tag lines are complex, sometimes glamorous, and in some cases menacing. They reveal a lot about the companies



MAN: What's going on?



JOHN: These idiots that sold me this phone system



have made it obsolete, they've brought out a new one.



Gee, you don't think they're going to boot me out of here over this... do ya?

and the advertisers—and about the viewers.

As is generally the case, though, real life is more compelling than fiction. IBM's ad agency woes almost overshadowed its product introductions and its *M*A*S*H*-celebrity-exploiting commercials. In terms of pure drama, the turmoil over the defection of six top executives from IBM's ad agency, Lord, Geller, Federico, Einstein, to

form a new agency, Lord Einstein O'Neill & Partners, rivals anything Hollywood or Mad. Ave. could create.

The resulting lawsuit charged that the departing Lord Geller executives, led by chairman and CEO Richard Lord, solicited clients and employees of the agency before leaving the fold. IBM was one of those clients, and by far the most important one.

The courts imposed a temporary injunction prohibiting Lord Einstein from accepting more business from past or present clients of Lord Geller. By the time this article appears, the judge will most likely have lifted the stay, but some harm has doubtless been done to the new firm (which had garnered quite a few clients of Lord Geller's) and to the clients left in the lurch.

IBM took action of its own. With management consultants McKinsey & Company reviewing its advertising and marketing operations, IBM sought new

Computer makers are big players in the ad game, but are "slice-of-death" scenes the right choice?

agencies with which to deposit some of its \$138 million ad budget. It gave six agencies the same assignment, to test how they would position the company and how they would position a product: IBM's PS/2 desktop publishing line. In addition to Lord Geller and Lord Einstein, the competing agencies included Wells, Rich, Greene; D'Arcy Masius Benton & Bowles; Grey Advertising; and Lintas: New York.

It was a Hollywood screenplay in the making. The defection, the lawsuit, and the face-off among the six advertising agencies (especially with ad spending and ad stocks down) were more com-

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AT&T's "The Right Choice" commercials for its business systems and international fax services are cut from the same upscale fabric as *Wall Street*, with overstressed, overstimulated, power-is-all corporate executives as protagonists and antagonists, like the greedy characters in Tom Wolfe's *Bonfire of the Vanities* and the brats in Louis Auchincloss's fictional law firms.

To sell to the target market of predominantly mid- to high-level male executives, AT&T invests heavily in advertising time during sports programming. The company ranks sixth among all advertisers on network sports broadcasts. According to the Television Bureau of Advertising, AT&T's 1987 budget for that category of programming was \$34.3 million.

With \$100 million plus budgeted for 1988 ads, AT&T launched an aggressive second generation of "The Right Choice" ads early this year. The three New York ad agencies for AT&T's Business Markets Group—Ogilvy & Mather, McCann-Erickson, and Young & Rubicam—were to collaborate on the campaign, but apparently a creative shootout ensued, and the campaign Ogilvy & Mather designed was chosen as the prototype for the others to follow. (Ironically, at the same time that AT&T was announcing its new campaign, *Adweek's* January 11, 1988, issue proclaimed the first generation of AT&T's Ogilvy & Mather spots one of the worst ad campaigns of 1987.)

The new campaign's slice-of-death commercials capture the fear and loathing that lurk below the surface in stressed-out, hyped-up corporate types. The ads' goal is to show how buying decisions affect corporate as well as personal lives, and they endow hardware

and software with all the tension and emotion more commonly associated with sex, money, and power.

The same medium that has preyed on our fear that we've chosen the wrong deodorant, toothpaste, and shampoo is now digging deeper into our psyches. It's probing our fear about our jobs, our standing in our professions, our credibility, our performance. Unlike Compaq's more egalitarian headline in its new ad for the 386S computer—"Now

there's room for everyone on the fast track"—the subtext of AT&T's slice-of-death commercials is that business is a cutthroat endeavor with room for only tense and abrasive people.

According to Langer Associates, a market research firm, two of the top advertising themes to have emerged in the 1980s are yuppies and stress. AT&T is combining the two, using the dark side of yuppies' high-stress business lives—the selfish, desperate striving that involves shoving other people aside as you claw your way to the top—to capture viewers' attention and involve them emotionally.

The ads, shot by one of the current superstars of commercial direction, Leslie Dektor, stir up emotions over job stress and office conflict and then offer the advertiser's product as a high-tech broom—midway—a way to be smarter than the

other guy. They feature what *Adweek's* Barbara Lippert calls "hard-driving, twitchy corporate types" telling bleak stories of battles with ineffective hardware and software, inept coworkers and unreasonable bosses, and competitors inside and outside their companies. Suspender-clad men with clenched jaws and power ties, and women with shoulders padded out to there, furrow their brows and cavil about deadlines and deals. All the while the handheld, bobbing camera wanders around the



The defection, the lawsuit, and the face-off among the six agencies were more compelling than any fiction.

They feature what *Adweek's* Barbara Lippert calls "hard-driving, twitchy corporate types" telling bleak stories of battles with ineffective hardware and software, inept coworkers and unreasonable bosses, and competitors inside and outside their companies. Suspender-clad men with clenched jaws and power ties, and women with shoulders padded out to there, furrow their brows and cavil about deadlines and deals. All the while the handheld, bobbing camera wanders around the

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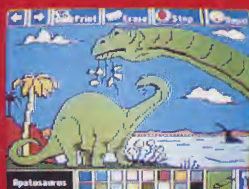
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MEDIA

room—a jerky technique Lippert (who also coined the “slice-of-death” description) refers to as “cinema very nausea.”

With dialogue rife with guilt, recrimination, and fear of failure, the scenarios are based in reality, but with a hard edge. One recent AT&T spot, entitled “Standards,” shows the quandary a group of department heads faces in trying to expand the company’s computer system—all because the system is not from AT&T. You can almost smell the failure in the air.

The same medium that has preyed on our fear that we’ve chosen the wrong deodorant, toothpaste, and shampoo is now digging deeper into our psyches.

In sharp contrast to GE’s “We bring good things to life” ads and AT&T’s own “Reach out and touch someone” long-distance-telephone commercials, these ads care little about the positive aspects of business, or about feelings of cooperation and trust. Timed to prey on people’s increased awareness of a perpetually precarious economy, they encourage, rather than simply reflect, the sense of insecurity, dislocation, and stress that permeates the land.

The bobbing-camera technique is part of a trend that also includes grainy (sometimes even black-and-white) film, choppy dialogue, and dim lighting. Advertisers using these techniques recognized that many commercials lacked believability because they were so slick, well lighted, and unrealistic. (In a reverse tactic, ad agencies for products such as Ragú spaghetti sauce have heightened the unreality of their commercials, producing minisitcoms complete with laugh tracks and canned applause.)

The new-style commercials try to give viewers the feeling that they’re eavesdropping on something important. In its controversial print ads, Benson & Hedges tried this tack to get our attention, with an incongruously pajama-clad young man standing at the head of a dinner party table. And Nissan’s portrayal of a meeting of car designers uses the same eavesdropping technique as

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the CGA/EGA/MCGA/VGA/Hercules display adapters. It requires a PCjr through PS/2 or compatible, DOS 2.1 or later, about 70k of memory, but not a math coprocessor. Comes on a 5 1/4" DS-DD diskette. Not copy protected. Suggested retail price: \$30. Check your local dealer. For more information, or to order by mail, just call.



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MEDIA

Wang's ads, which depict conversations between salesmen using technical jargon such as *VS*, *WP*, and *benchmarking*, words that only Wang's prospective customers would understand.

But no matter how obnoxious a picture of bratty elitism many of these ads paint, they're effective. They make viewers feel uncomfortable, and that causes them to remember the ads and the products—which makes advertisers euphoric. In the advertising business, you're nobody till somebody hates you.

Right now AT&T's commercials are the biggest offenders, but some spinoffs are challenging them for that position, including the New England Telephone Company's "Solving Problems" campaign, a product of Cabot Advertising. These spots—a miniseries of episodes designed to build a dramatic conflict and then resolve it over a period of months—involve a confrontation between a slick yuppie architect and an older architect, the titular head of the firm. Backstabbing, deceit, and dirty politics form the text of the episodes, as the younger man tries to slither behind the older man's back to make a deal for the design of a museum.

Some irate viewers have demanded that the company stop airing the commercials. One protester, Amy Stark, a Boston freelance graphic artist, wrote to *Adweek* suggesting that the name of the campaign be changed to "How to Stab Your Business Partner in the Back for Fun and Profit."

An acceptable resolution of the miniseries would be the repudiation of such unethical business behavior and a positive resolution of the conflict. The spots may turn out to be a serial morality tale for our times, or they may be just another barometer of the caustic business climate. Viewers are temporarily laying aside their channel zappers, waiting to find out what the resolution will be. The advertisers couldn't be happier.

Is what we're seeing on the small screen really the mirror image of what's happening in companies such as AT&T and ad agencies such as Lord Geller, both of whom are facing increased competition and economic challenges? Are the AT&T and New England Telephone commercials the first of many in the slice-of-death genre? As Compaq's more traditional copy for its new 386S ads says (in another context): "Power users, fasten your seat belts." ■

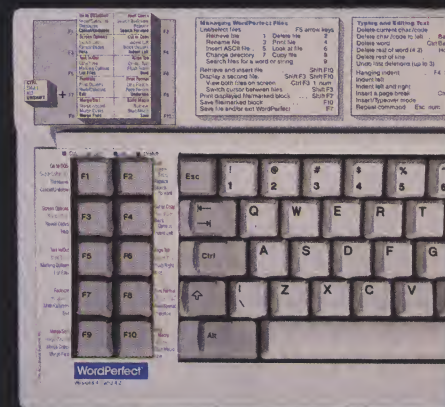
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IMPACT

By DOUG VAN KIRK

A patent attorney strides into the courtroom carrying not a stack of briefs or a pile of depositions but a Toshiba laptop. Throughout the hearing, his assistants use Seaside Software's AskSam, a text-oriented database manager with hypertext searching facility, to find critical passages in the depositions, briefs, and decisions that they have stored on disk.

PCs, once relegated at law firms to word processing, bookkeeping, and accounting tasks, are finally beginning to break ground among technology-savvy lawyers. An Indianapolis attorney, for example, uses his Macintosh and Living Videotext's More, an outline processor that can import graphics, to help him prepare witnesses and take depositions. And at the Boston firm of Lahive and

Cockfield, lawyer David Powsner, an avid dBase user, has created a document manager that tracks critical information about thousands of documents.

Powsner says Lahive and Cockfield has automated "virtually every aspect"

PCs are finally making a case for themselves in technology-savvy law firms.

of its work. The firm uses PCs to access legal information through the online services Dialog and Lexis. And it plans to use Software Publishing's Harvard Graphics to illustrate evidence for an upcoming trial.

Other lawyers use PCs to manage their schedules and workloads and to monitor litigation. The need for this kind of project management has created a market for consulting and other services to help lawyers get their work done faster.

"The courts are increasing the pressure on attorneys to meet deadlines," explains Deborah Hemley, of Legal Support Services in Boston. Hemley's firm produces a series of modular software programs that help lawyers manage their cases and schedule their work, as well as check for conflicts of interest among cases.

Some lawyers are using case management software to build marketing strategies, according to Hemley. Using software from Legal Support Services, lawyers can evaluate their track records and their firms' success rates in certain types of cases. They can then use this information to help market their services.

Hemley cautions that such software is effective only when everyone in a firm accepts and supports it. "Some



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IMPACT

firms need to change the way they work in order to manage information effectively," she says.

Although some lawyers resist this sort of change, a number of applications have already earned wide acceptance. Such online services as Lexis, Dialog, and Westlaw, for example, have taken some of the drudgery out of legal research. These services maintain thousands of documents that a lawyer or legal assistant can search in a matter of seconds.

Lexis and Westlaw give users sophisticated search commands to find the documents they need—from cases and court decisions to copyright registrations and state statutes. They each maintain more than a thousand databases and support access by PCs, Macs, and just about any other type of computer or dial-up terminal.

Dialog, which maintains documents related to law, business, and science, not only keeps track of the latest corporate names and trademarks but actually lets users view and print corporate logotypes.

The technological transition in law firms has been anything but smooth, though. Automation is still an emotional issue for many lawyers. "Few experienced attorneys can truly be called computer literate," says a young lawyer in a Texas law office. His comments are echoed by others, who cite older attorneys' inability or unwillingness to type as an impediment.

Even firms with MIS or data processing departments find resistance. "Often it's only the back-room tasks that get automated," says Dan Caine, a tax lawyer turned software entrepreneur. "Law firms haven't applied computers to the actual practice of the law." Caine says that the automation of such tasks as contract writing has progressed no further than simple word processing.

Caine's firm, Legal Knowledge Systems of Watertown, Massachusetts, produces AskDan, a tax preparation program. Caine believes that artificial intelligence is the key to useful software in the law office. He predicts a bright future for applications that automate the thought processes behind the preparation of legal materials, but cautions that it will be a while before many lawyers embrace such technology.

While many in the legal profession agree with Caine's assessment, some argue that they would use their PCs for law-related tasks now if more software were available. Still others say that cur-

rent software is too difficult to use or too expensive.

Glen Ashman, a lawyer in Georgia, cites high cost as a roadblock. As for online searching, Ashman claims that "it's still cheaper to do it manually." He says that hourly rates for such services are higher than the rate his clients pay for his time.

Large firms are able to justify online research costs. They have the resources to keep researchers on staff—something many lawyers say is necessary to take full advantage of an online system.

Soon lawyers may find that they will no longer be able to avoid using PCs. In an increasingly competitive market, law firms may be forced to automate just to survive. ■

Doug van Kirk is an associate editor of PC/Computing.

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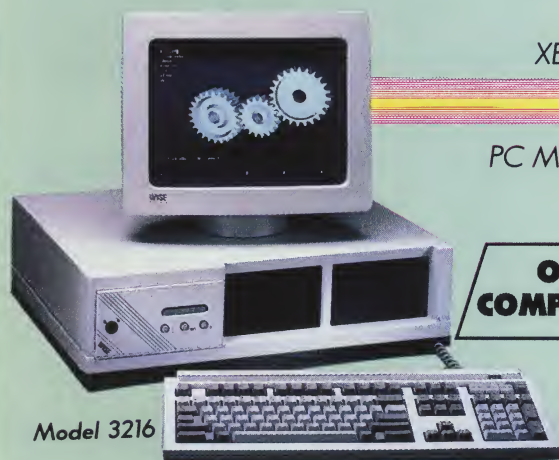


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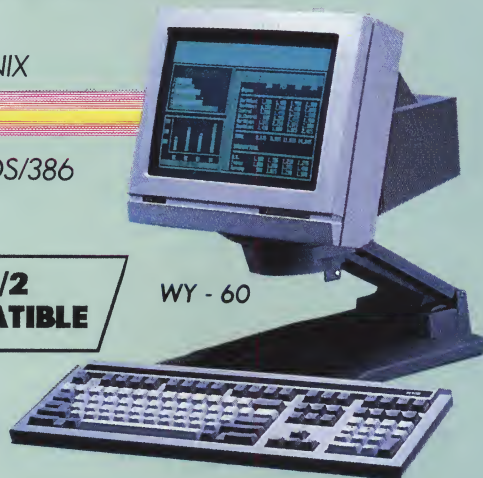
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CIRCLE NO. 250 ON READER SERVICE CARD.

KIDS

Edited by CAROL OLSEN DAY

Kids everywhere have written to us, and we thought other kids would be interested in what they're saying.

One kid writes that she'd be interested in being a "computer pal" with one or more of you. By the way, how many of you use computer bulletin boards to exchange information with other kids online? Write and tell us about your experiences.

As for the rest of you out there, we'd really like to hear more about what PC software programs you're using—for schoolwork and for fun—and what you like or don't like about them. We'd also like to know if there are any games you've seen or heard about but haven't used yet that you'd like us to review in the Fun! department of this magazine.

"Crazy Eights" player Melanie Jones of Canton, Michigan. Melanie, who is ten years old, uses her father's AT compatible. She likes to play games, write stories, and do other "great" things on the computer, and she would like to be computer pals. She lives at 172 Kings Way, Canton, Mich. 48188, and says:

I like playing games on the computer best. My favorite game is Crazy Eights on the Big Blue Disk (BBD). It's really fun! You have to get rid of all your cards before the computer does. Also, I like making up fireworks displays. I like the flag routine best, that is on the BBD too. I'm using PFS:Write to write this letter.

PC-needy Jason Irby of Princeton, New Jersey. Jason, of P.O. Box 632, Princeton, N.J. 08542, uses an Atari but wants a f-a-s-t PC. He asks through PC/Computing:

Dear Dad,
OK, you've been kind. You got me an



Atari 800 XL. But the thing is s-l-o-w. We're talkin' major league slow! So I got up the courage (and believe me it takes a lot of courage) to write you this. Here's the point... can I have a faster computer, preferably an IBM PC? It is f-a-s-t. We're talkin' major league fast! And no more "Oops, ran outta memory." So pleeeeee consider it, OK?

Hopefully,
Jason

P.S. Maybe we could get some games...

Budding novelist Roberta Gay Carpenter of Santa Fe, New Mexico. Roberta, whose address is P.O. Box 16180, Santa Fe, N.Mex. 87506, is 13 years old and has written stories and articles since the age of three. She told us about her writing projects, including a science fiction novel called *Deep Space* and a "Star Trek" novel called *Intercept!* She uses WordStar on a Kaypro 2 and has used the Osborne computer, too. We can't print all of her letter, but here are some of her thoughts and observations:

At age eight I was desperately pecking out novellas worth no more than their sentimental value on the typewriter. At age

Kids... this is your page in PC/Computing. Not just for you, but also by you. Send your submissions to Kids Department, PC/Computing Magazine, 80 Blanchard Rd., Burlington, Mass. 01803. If we publish your article, we'll send you a check for \$25—so make sure you include your complete home address and your telephone number.

nine, Daddy permitted me the use of his computer. I have gotten to the point where I do just about no handwriting except filling out forms and outlining my writing projects (when trying to THINK, you just can't beat having a pencil to chew on). Talent may have a great deal to do with my writing ability, but certainly I owe a lot to my computer. Without

it, I probably would have given up writing.

I know there are a lot more of you out there, of all ages, who possess the talent and desire to communicate through the art of writing. Make it easy on yourself. Get a word processor and learn to type the way I did. The benefits are just about infinite. Happy computing!

Poet Tamar Sagher of Chicago, Illinois. Tamar, age 14, has written a poem for the Kids department called "Judgment Time." She lives at 1221 East 54th St., Chicago, Ill. 60615.

Judgment Time

*I sit anxiously
facing the ominous black screen
and green characters
that I've just typed.
My shaking finger
approaches the enter key
and a harsh beep sounds
from the bowels of the machine.
I need not lift
my disappointed head
to face the words I know are there:
?SYNTAX ERROR*

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(PC Week, December 1987)



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(Family Computing, June 1987)

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CIRCLE NO. 134 ON READER SERVICE CARD.

FUN!

By DONALD B. TRIVETTE

The producer George Lucas, undisputed king of Hollywood magic and special effects, has entered the computer game market. His film credits are legendary: *American Graffiti*, *Raiders of the Lost Ark*, *Indiana Jones and the Temple of Doom*, and, more recently, *Willow* and *Tucker: The Man and His Dream*. Not only did Lucas write and direct the *Star Wars* saga, but through his Industrial Light and Magic company and Sprocket Systems, he has visually and aurally enriched dozens of films. Can he pull off similar success with computer games?

Lucas's Game Division, though added to his Lucas-film entertainment empire in 1983, has just released its first two products for the IBM PC. *Maniac Mansion* appeared on the shelves in May, and *Zak McKracken and the Alien Mindbenders* began shipping in July. Both are animated adventure games with 3-D graphics, and both have strong, imaginative story lines.

Maniac Mansion features Dave Miller and his friends, who must rescue Dave's girlfriend, Sandy, from the odious Dr. Fred, who wants her brain. The game has five solutions, depending on which combination of Dave's seven friends you pick to accompany him.

While roaming around Dr. Fred's mansion, Dave encounters Nurse Edna, Weird Ed, and the ghastly Green Tentacle and its purple



Zak McKracken reads a sign beside an ancient Incan bird feeder in the Peruvian jungle.

cousin. There's a nuclear reactor in the basement, a chain saw in the kitchen, a Hunk-o-Matic exercise machine in Dead Cousin Ted's room, and a Weird Edsel in the garage.

In *Zak McKracken and the Alien Mindbenders*, Zak, a sleazy tabloid reporter, must save the earth from aliens who have inflicted a universal stupidity epidemic

on the population (this is a game?). After taking over the Phone Company, the aliens begin transmitting a 60-cycle hum over phone lines, which

The creator of *Star Wars* puts his unique stamp on computer games.

reduces the IQ of those who hear it.

Zak must assemble a machine that can stop the aliens and restore the planet's intelligence. Teaming up with Annie, a curvaceous San Francisco woman, and two coeds who have recently visited Mars in their souped-up intergalactic van, Zak travels around the world—to London, Egypt, Nepal, Zaire, the Bermuda Triangle, Peru—in search of the components for the machine. The aliens are disguised with hats and funny nose-mus-



Dave peers over a skeleton outside the door to the "Seckrit Lab" in Maniac Mansion.

FUN!

tache glasses, so Zak must disguise himself in similar fashion. A pair of the glasses is included with the game.

Both games use a cinematic "cut to" technique to add depth and show simultaneous activity in other "locations." As Zak wanders around his small apartment, for example, the game suddenly pauses and cuts to a short animated sequence showing two scientists standing around the aliens' stupidity machine, talking to each other. Sometimes these cuts give clues.

While the story lines of Maniac Mansion and Zak McKracken are clever, their animation is not. You would never know that these games come from a company known for superb special effects and computer animation. In one scene from Zak McKracken, Zak tries to awaken a bus driver by

Is there any way to get by the ghastly Green Tentacle?
Hint: This hyperactive leg of squid is fond of wax fruit.

pounding on the bus with a golf club. You hear the thumps as he pounds, but on the screen Zak just stands there, arms at his sides, leaving his golf strokes to your imagination.

Similarly, a Maniac Mansion character, reaching for a bottle of film developer, drops and shatters it, spilling the liquid down a floor grate. But none of this is visible. Even the broken bottle on the floor is unrecognizable.

Animation aside, both games offer an innovative user interface. The top two lines of the screen show words spoken by the characters or game-related messages. The animation win-

dow appears below, taking up the largest part of the screen. Beneath the animation is the "sentence line," where players construct messages such as "Unlock door with key" or "Walk to cabinet." At the bottom of the screen are three lines of verbs, five words to a line.

To avoid conventional adventure game interfaces, in which players type commands such as "Pick up the key," the Lucasfilm game developers sought something both simple and intuitive. The result is a point-and-click interface like that made popular by the Apple Macintosh. Instead of typing "Open door," you point to

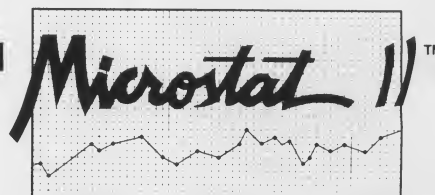
the verb "Open," click, then point to the door in the animation window, and click again. The games allow you to use a keyboard, a joystick, or a mouse.

While the interface is a good idea, it needs some refinement. The cursor is made up of four randomly blinking, inward-pointing arrows that would do justice to the marquee of a Las Vegas casino. It's both annoying and distracting.

The games are awkward to play from the keyboard, and only slightly better with a joystick. But they really shine if you've got a mouse. Point to "Pick up," click, point to "Key," and double-click—it's a snap.

A big disappointment is that you can't pilot your characters over collapsing bridges, across treacherous mountains, and safely around dangerous creatures.

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CIRCLE NO. 114 ON READER SERVICE CARD.

FUN!

Instead, you select "Walk to," point to a destination with the cursor, and click: the computer guides the character to the destination. You aren't allowed to trip

over objects, fall off cliffs, or step into holes.

Lucasfilm game designers say this is an advantage, claiming that game players are frustrated by accidents:

"Oops, you fell out of the tree and died; you'll have to start again." Yet one of the charms of playing adventure games is the fun of testing your skill at staying out of trouble. How can the makers of *Raiders of the Lost Ark* miss the importance of physical action in adventure games?

Instead of danger, both games concentrate on creative, wild-and-woolly puzzle solving. For example,

how are you going to get past the Green Tentacle in Maniac Mansion? The creature won't hurt or kill you—almost nothing in these games will—but it blocks the door of a room you need to explore. (Hint: This hyperactive leg of squid is fond of wax fruit.) And in Zak McKracken, how are you going to grind up a loaf of hard bread to make the crumbs needed to fill an ancient Incan bird feeder? (The answer involves a garbage disposal and a little creative plumbing.)

If you have difficulty associating bread crumbs with a disposal or thinking of wax fruit as a pacifier, you can spend an extra \$7.95 on a hint book for either game. The clues are printed in blue ink and covered with a red mask, so you can't read the answers unless you use the magic red-gel strip provided.



Syd, one of Dave's pals in Maniac Mansion, stands over a grate where he's broken a jar of film developer that is critical to saving Sandy.

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DATE	PAY TO THE ORDER OF	CHECK NO	AMOUNT		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]		
Enter the date for this check or disbursement or press ESC to see the menu.					
F1 Help F2 Edit F3 Del F4 Find F5 Acct F6 Vend F7 [REDACTED] F8 [REDACTED] F9 Date F10 Save					

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CIRCLE NO. 183 ON READER SERVICE CARD.

Cocaine lies.

After nearly a decade of being America's glamour drug, researchers are starting to uncover the truth about cocaine.

It's emerging as a very dangerous substance.

No one thinks the things described here will ever happen to them. But you can never be certain. Whenever and however you use cocaine, you're playing Russian roulette.

You can't get addicted to cocaine.

Cocaine was once thought to be non-addictive, because users don't have the severe *physical* withdrawal symptoms of heroin—delirium, muscle-cramps, and convulsions.

However, cocaine is intensely addicting *psychologically*.

In animal studies, monkeys with unlimited access to cocaine self-administer until they die. One monkey pressed a bar 12,800 times to obtain a single dose of cocaine. Rhesus monkeys won't smoke tobacco or marijuana, but 100% will smoke cocaine, preferring it to sex and to food—even when starving.

Like monkey, like man.

If you take cocaine, you run a 10% chance of addiction. The

risk is higher the younger you are, and may be as high as 50% for those who smoke cocaine. (Some crack users say they felt addicted from the *first time* they smoked.)

When you're addicted, all you think about is getting and using cocaine. Family, friends, job, home, possessions, and health become unimportant.

Because cocaine is expensive, you end up doing what all addicts do. You steal, cheat, lie, deal, sell anything and everything, including yourself. All the while you risk imprisonment. Because, never forget, cocaine is illegal.

There's no way to tell who'll become addicted. But one thing is certain.

No one who is an addict, set out to become one.

C'mon, just once can't hurt you.

Cocaine hits your heart before it hits your head. Your pulse rate rockets and your blood pressure soars. Even if you're only 15, you become a prime candidate for a heart attack, a stroke, or an epileptic-type fit.

In the brain, cocaine mainly affects a primitive part where the emotions are seated. Unfortunately, this part of the brain also controls your heart and lungs.

A big hit or a cumulative overdose may interrupt the electrical signal to your heart and lungs. They simply stop.

That's how basketball player Len Bias died.

If you're unlucky the first time you do coke, your body will lack a chemical that breaks down the drug. In which case, you'll be a first time O.D. Two lines will kill you.

Sex with coke is amazing.

Cocaine's powers as a sexual stimulant have never been proved or disproved. However, the evidence seems to suggest that the drug's reputation alone serves to heighten sexual feelings. (The same thing happens in Africa, where natives swear by powdered rhinoceros horn as an aphrodisiac.)

What is certain is that continued use of cocaine leads to impotence and finally complete loss of interest in sex.

It'll make you feel great.

Cocaine makes you feel like a new man, the joke goes. The only trouble is, the first thing the new man wants is more cocaine.

It's true. After the high wears off, you may feel a little anxious, irritable, or depressed. You've got the coke blues. But fortunately, they're easy to fix, with a few more lines or another hit on the pipe.

Of course, sooner or later you have to stop. Then—for days at a time—you may feel lethargic, depressed, even suicidal.

Says Dr. Arnold Washton, one of the country's leading cocaine experts: "It's impossible for the nonuser to imagine the deep, vicious depression that a cocaine addict suffers from."

FUN!

Melissa, one of Zak's sidekicks, outside her interplanetary van on a short visit to Mars.

The strip shows you small amounts of information at a time without divulging the entire story.

The games' copy protection schemes are equally

inventive. The designers wanted something simple, effective, and foolproof. In Maniac Mansion, for example, you must pass through a doorway that requires you to give a password, which changes each time you enter. A list of several thousand passwords comes with the game, printed on dark red paper with black ink. Try to photocopy *that*.

The passwords elude reprinting as well. Instead of being alpha or numeric characters, they are symbols, such as a square with a dot inside it. Let's see someone put *that* on a bulletin board. The scheme works beautifully.

With all their innovation and imagination, it's too bad that Maniac Mansion and Zak McKracken and the Alien Mindbenders offer grade B animation. Both games are cleverly designed,

but the result falls short of the magic we expect from George Lucas. □

Donald B. Trivette writes frequently about technology. He lives in North Carolina.

Maniac Mansion

List Price: \$44.95;
hint book, \$7.95.

Requires: 256K RAM; one disk drive; EGA, CGA, MCGA, Hercules, or VGA graphics. Joystick or mouse optional. Not copy protected.

Zak McKracken and the Alien Mindbenders

List Price: \$44.95;
hint book, \$7.95.

Requires: 256K RAM; one disk drive; EGA, CGA, MCGA, Hercules, or VGA graphics. Joystick or mouse optional. Not copy protected.

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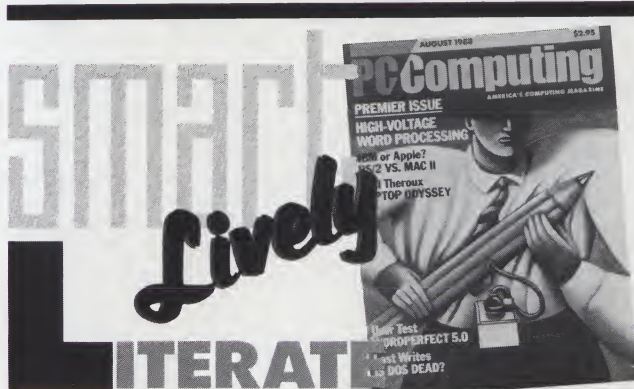
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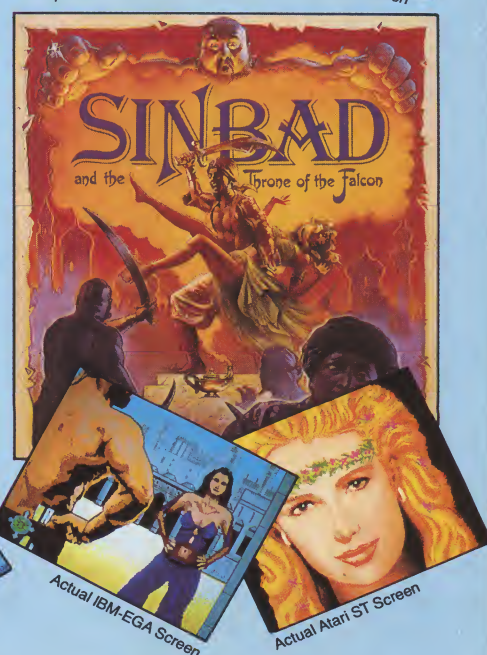
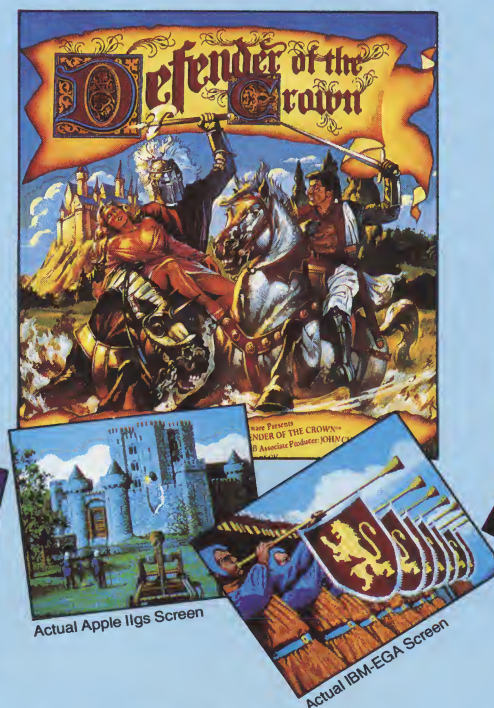
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HELP!

Edited by JEFF PROSISE

How can so many different brands of personal computers be IBM compatible when IBM has copyrighted its ROM BIOS to prevent competitors from lifting it? What role does the BIOS play in the machine's operation?

**Paul Ahrens
Middlebury, Connecticut**

The BIOS—short for basic input/output system—is a set of machine language routines that reside on one or more ROM chips inside your computer. It provides subroutines that give application programs and the operating system access to the computer's disk drives, displays, and other hardware.

The code that makes up the IBM BIOS is protected from duplication by copyright laws. Companies such as Phoenix Technologies have developed compatible BIOSs by duplicating functionality without duplicating the code.

Before it introduced the PS/2 line, IBM published BIOS source code listings in its technical reference manuals. Companies that develop IBM-compatible BIOSs go to great lengths to ensure that their programmers do not lift copyrighted code. A typical arrangement has a group of software engineers writing functional specifications for the BIOS and a group of programmers writing the code from those specifications. The programmers are strictly forbidden to look at IBM documents or to disassemble BIOSs on existing PCs.

While cleaning unneeded files from my hard disk, I accidentally erased a pair of files that together represented about 100 hours of painstaking data entry.

Can the DOS Recover com-

mand help? My coworkers and I are aware that methods exist to recover inadvertently deleted files, but we aren't quite sure how to go about it. And if Recover won't help, what will?

**Frances Traviligni
Champaign, Illinois**

First, *don't* use the Recover command. The DOS Recover utility is meant to help you recover files from disks that have developed bad sectors; it won't retrieve files that were inadvertently erased. Running Recover on an undamaged disk is a sure way to scramble its contents beyond recognition.

But there are several file recovery utilities that can rescue files from the brink of oblivion. One of the best known is The Norton Utilities, offered by Peter Norton Computing of Santa Monica, California. Norton was the first on the scene with file recovery software, barely a year after the PC was introduced in 1981. Two other packages—PC Tools, from Central Point Software of Portland, Oregon, and Mace Utilities, from Paul Mace Software of Ashland, Oregon—have also gained wide acclaim for their power and ease of use. All three products come with an assortment of additional utilities for such chores as unfragmenting hard disks, recovering from accidental formats, and checking disk integrity. And all list for \$100 or less.

Recovery is possible because when DOS deletes a file, it doesn't actually remove anything from the disk; rather, it overwrites the first letter of the filename in the disk directory. If no other disk activity has taken place since the file was deleted, it's relatively simple to replace the first letter of the filename and retrace the chain of clusters that stored the file's data.

In some cases, however, files cannot

be salvaged. Deleting several files at once makes reconstruction more difficult. Writing a new file to disk before the lost one is restored virtually guarantees the erasure can't be undone. When you accidentally erase a file, the best thing to do is leave the disk untouched until you return with a file recovery utility. A good one will help you recover at least some of your data when a full recovery isn't possible.

I'm thinking about replacing my PC's old color display and have heard a lot about the new "multiscanning" monitors offered by companies like NEC and Sony. How do multiscanning monitors differ from traditional ones? Are there any significant benefits to be gained from using one?

**Robert Roy
Milpitas, California**

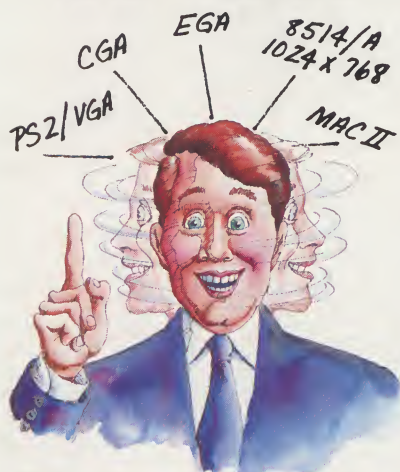
Multiscanning monitors offer one very attractive feature that conventional monitors don't: a single monitor will work with a variety of video adapters.

If you bought one of IBM's original Color Displays and a Color Graphics Adapter (CGA), you were probably more than a little miffed when you found out that upgrading to the EGA graphics standard was going to set you back the price of a new monitor in addition to the cost of the video board. The IBM Color Display would not handle the higher scan rates required for the EGA's higher-resolution screens.

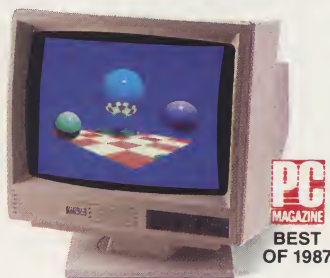
The same story has been repeated many times since. Most monitors are designed to meet the precise electrical specifications for a particular video board. Changing video adapters means changing displays as well.

Not so with the multiscanners. A

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HELP!

multiscanning monitor can sense the bandwidth of the signal coming from the display adapter and adjust its horizontal scan rate to match. In most cases, a multiscanner can be connected to a CGA, an EGA, a VGA, or a number of third-party boards offering additional graphics resolutions. The benefit to you is knowing that you can buy a display that won't become obsolete when the next generation of video adapters arrives.

I'm puzzled about the advertisements I've seen for PCs with hard disks offering more than 32MB of storage. Some, including IBM's PS/2 Model 70 and Model 80 machines, boast hard disk capacities up to 130MB.

Isn't it true that DOS can't use more than 32MB of disk space? Why is there so much fuss over storage capacity when the operating system can't handle it?

**Karen Freida
Billerica, Massachusetts**

Strictly speaking, DOS can't use more than 32MB of storage space on a single hard disk. But it can divide a large hard disk into a number of so-called logical volumes, each 32MB or smaller in size, and treat each one as if it were a separate hard disk.

DOS 2.0 and later versions allow you to partition a hard disk into as many as four sections. The size and number of partitions are set through DOS's Fdisk utility. With DOS 2.0, however, only one partition can be devoted to DOS; the rest are reserved for other operating systems such as Xenix. Furthermore, only one partition can be designated as bootable; the operating system that owns the bootable partition is the one given control at power-up.

DOS 3.3 changed the rules with the introduction of the extended DOS partition. An extended partition can contain several logical drives, all formatted for DOS, and can coexist with a primary DOS partition. The extended partition has two limitations: none of its logical drives can be made bootable, and the size of each logical drive is still limited to 32MB.

The significance of the extended DOS partition is that, for the first time,

hard disks with more than 32MB of memory can be devoted entirely to DOS. Before, spacious hard disks could benefit only those people running more than one operating system.

Our company recently purchased four PCs equipped with computer-aided-design (CAD) software to serve as dedicated CAD workstations. We bought 80386 machines for speed, but were disappointed to find that software performance was unacceptably sluggish.

Our dealer recommended that we add a math coprocessor to each workstation, claiming that drawing speed might become ten times faster as a result. What exactly does a math coprocessor do? Is it difficult to install?

**John Besette
Shaker Heights, Ohio**

A math coprocessor is simply a specialized piece of hardware designed to perform complex floating-point math operations quickly. Floating-point math refers to calculations done on numbers that contain decimal points—5.73, for example.

Special instructions built into the math coprocessor let it do in a few clock cycles what a normal microprocessor might require several hundred clock cycles to do.

An Intel math coprocessor—an 8087, 80287, or 80387—is a small chip, similar to Intel's other microprocessor chips, that fits into the motherboard alongside the CPU. Installation is as simple as seating the coprocessor chip into its socket and following the steps outlined in your owner's manual or *Guide to Operations* to tell the system that a math chip has been installed. On a PC, you toggle a dip switch on the system board; on an AT, you run the Setup utility; and on a PS/2, you reboot with your Reference Diskette and run the automatic configuration program.

Only applications written to take advantage of a math coprocessor will benefit from the presence of one. Many calculation-intensive programs such as CAD packages and spreadsheets include coprocessor support, but not all do. You'll have to check your software's

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DESIGNCAD

HELP!

documentation to verify that it will recognize a coprocessor.

The claim that drawing performance may increase by as much as ten times is not a bogus one: a coprocessor will make a dramatic difference. Most PC CAD packages are simply unworkable without dedicated math hardware. AutoCAD Release 9, in fact, was one of the first major products to require a math coprocessor.

I am considering buying a computer for both business and personal applications. Selecting the right hard disk to go with it, however, has proved to be a confusing proposition.

With a variety of different drive interfaces available, and figures on such attributes as transfer speed, access time, and disk interleave being proffered by the various vendors, how do I sort through the various claims and pick

what's best? And what else should I consider?

**Richard T. Laubach
Dayton, Ohio**

Transfer speed, average access time, and disk interleave ratio all have to do with how fast data can be transferred to and from a hard disk. Transfer speed is the raw count of the number of bits that can be passed through the drive controller in a given time interval, usually one second. Average access time is the length of time it takes for the drive head to move from one cylinder to another. The disk interleave ratio pertains to the way the disk's sectors are mapped onto drive cylinders.

Transfer speed is largely dependent on the drive controller. The drive controller serves as the interface between a hard disk and the host machine's system bus. Enhanced Small Device Interface (ESDI) controllers generally offer the highest transfer rates, but they also fetch the highest prices. Speed considerations aside, the type of controller is largely irrelevant as long as the drive

and controller are matched. Since most drives and controllers are sold as a package, this is rarely a problem.

More important than transfer speed is the drive's rated average access time. This figure is quoted as an average because the length of time required for the drive head to move from one cylinder to another varies with the physical distance between cylinders.

Disk interleaving is a way of matching the layout of the hard disk to the speed of the controller to enable more efficient operation.

Your best bet in selecting a hard disk is to consider storage capacity first, access time second, and transfer speed and interleave ratio third.

Do you have a PC-related question that might be of general interest? Our Help! column is designed to provide concise, practical advice on the topics that interest you. We aim to cover as many subjects as possible within the available space. Please send your letters to Help! Column, PC/Computing, 80 Blanchard Rd., Burlington, Mass. 01803.

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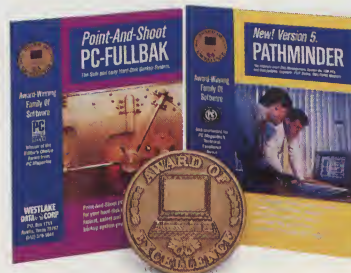
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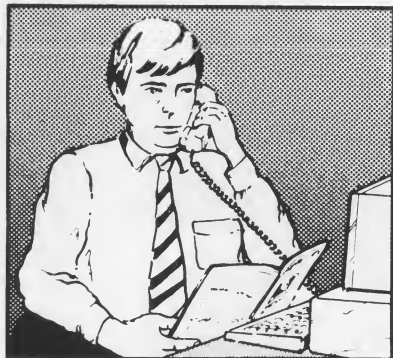
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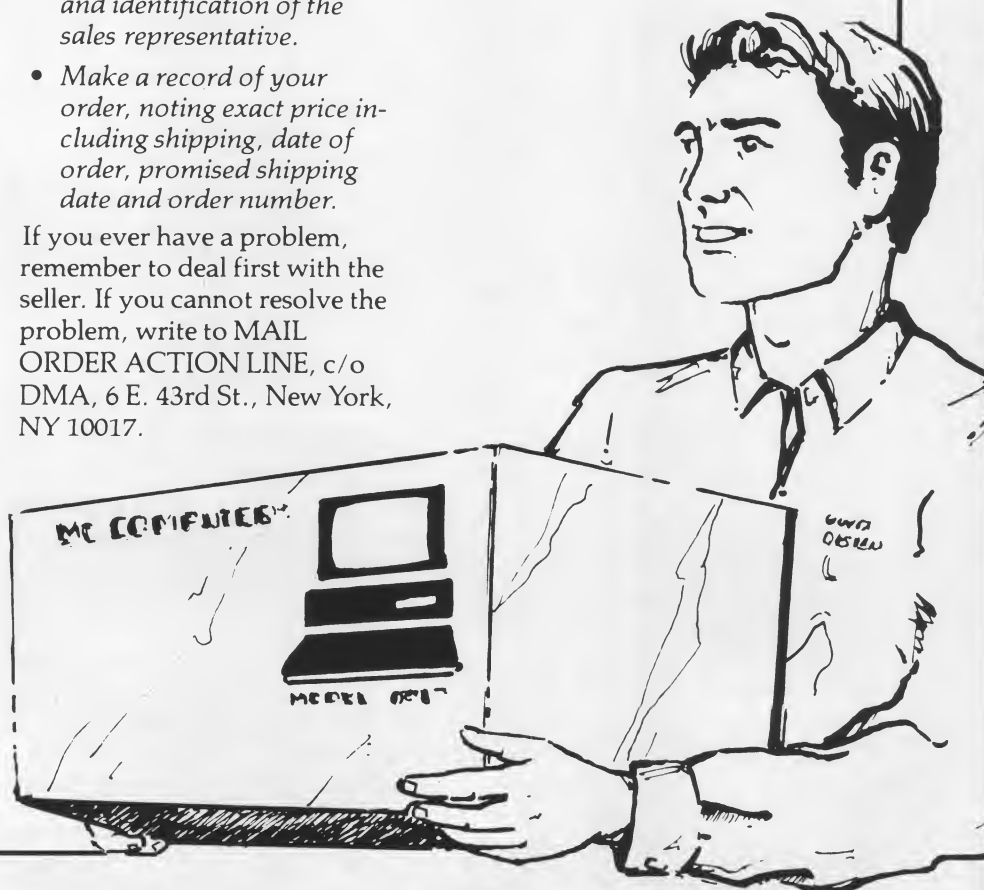
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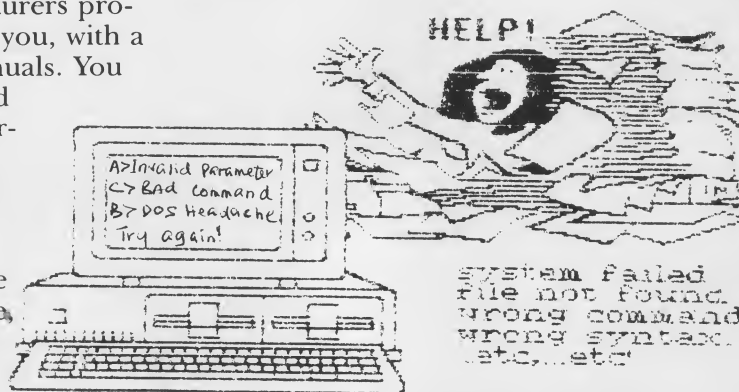
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CIRCLE NO. 158 ON READER SERVICE CARD.

NEXT

By JEFFREY ZYGMONT

Dorothy had the yellow brick road. Hansel and Gretel left a trail of bread crumbs. The Greek hero Theseus followed a thread out of the Labyrinth after slaying the savage Minotaur.

Travel just isn't that easy anymore. Today's road systems in L.A., Boston, and any number of other cities can confound even the cleverest pathfinder.

Now computer technology has provided a solution: electronic road maps displayed on dashboard-mounted video monitors. These navigation systems can show you where you are, track your progress as you drive, even direct you to a destination.

The first such system is The Navigator, available for \$1,395 from Etak, Inc., of Menlo Park, California. At the moment the device can't be had outside the Golden State. But it's coming.

Etak's Navigator features a 4½-inch-diagonal monitor mounted on a flexible neck. It displays a road map with the car's position marked by an arrow in the center. As the car moves, the map display scrolls downward; the car's position is continuously updated by the central processor, keeping the arrow in the center of the map. When the car turns, the map rotates on the

screen, so it always shows the roads in the same orientation you see through the windshield. The monitor can display a map of an area as small as ⅛-mile square, with roads labeled, or zoom outward to cover as much as a 40-mile area. You can even enter the street address of your destination using a keypad on the monitor; your goal will show up as a flashing star on the display.

Powering The Navigator's display is a shoebox-sized computer that hides in the trunk. At its heart is an 8088-based microprocessor and 256K RAM—equivalent to that of an entry-level personal computer.

Etak's processor creates the map display from digital maps stored in an external database, and it constantly listens to signals from sensors in the wheels that tell it how far the car travels. It knows the car is turning when one wheel travels farther than its mate—in other words, when an outside wheel covers a wider arc than an inside wheel. Thus The Navigator computes the de-

gree and direction of a turn according to the difference in travel between wheels. To avoid errors, the processor correlates wheel distance with readings from an electronic compass.

This technique, called dead reckoning, is not sufficient to keep track of a car's position to within 50 feet. That requires a method the company calls augmented dead reckoning, in which the processor compares the computed vehi-

Electronic road maps promise to lead motorists out of the labyrinth.

cle position with its map database. Say the central processor computes a turn of 90 degrees, but the map shows that the road at this particular intersection veers off at a 45-degree angle. Instead of showing the car drive off the road—an unlikely scenario—the system is programmed to assume that the car is traveling on the road nearest the computed position. Should the processor get mixed up, you can recalibrate it by driving to a known location and entering the address using the keypad.

The Navigator's biggest shortcoming lies in its use of cassette tapes to hold both the map database and the system software that boots the processor when the machine is powered up. Storage on the cassettes is limited—it takes four tapes to cover the San Francisco Bay area, for example. To overcome this limitation, naviga-

Since the thought of drilling holes into a dashboard horrifies even the most casual autophile, the Navigator can also be mounted on a flexible support that fastens to the car's floor.



NEXT

tion technology is rapidly heading toward CD-ROM—compact discs with read-only memory.

Because a single CD-ROM disc has more capacity than fifteen hundred 360K floppies, it can store digital maps for the 40 major U.S. metropolitan areas, plus the entire interstate highway system. That's no small feat when you consider that, in addition to roads and

says Honey, Etak will sell only the map discs, probably for about \$150 apiece. Updated discs will be released annually. Expect each to contain map data for a large region. The New York City disc, for instance, spans the area from Boston to Washington, D.C. The Los Angeles disc covers an area stretching upward to Santa Barbara and as far south as Mexico. Extra storage space on the discs is

Honey won't say which stereo makers will provide the gear, but the best guesses are the West German company Blaupunkt and Japan's Clarion. Both already have agreements with Etak. Blaupunkt has an exclusive license to sell the Etak navigation system in Europe, and sales of its Travel Pilot are expected to start next year. Similarly, Clarion has exclusive rights to sell the system in the Far East.

In fact, the time may soon arrive when you won't have to add a navigation system to your car: it will be there as a standard feature. In Japan, Toyota already offers a limited navigation system on its high-priced Crown models. The price: a hefty \$2,700.

That's too much, says John Moretti, program manager of electronic systems for Delco Electronics, an arm of General Motors. According to GM market research, navigation systems must be priced between \$500 and \$700 before many people will buy them. Even at that range, Moretti doesn't expect more than about 5 percent of car buyers to go for them. A 1987 study by the University of Michigan is more optimistic. It

The time may soon arrive when you won't have to add a navigation system to your car: it will be there as a standard feature.

road names, a map database includes building addresses.

So don't buy The Navigator yet. CD-ROM-powered systems are coming, probably by next year, says Stan Honey, Etak's founder and technological guru. At the moment, Etak is finishing up its mapmaking enterprise, compiling digital maps from sources such as local authorities, the U.S. Geological Survey, and the U.S. Census Bureau.

When the CD-ROM systems arrive,

used for additional data, such as a complete Yellow Pages directory for the region. That will let you ask your Navigator to show you where, say, the nearest service station is located.

Seeing its future in digital mapping and navigation software, Etak is turning hardware development over to makers of car audio equipment. Systems should run about \$1,000, says Honey. The CD-ROM drive may even do double duty as an audio compact disc player.

List of Poor Excuses

- 1) "I forgot."
- 2) "I never know what to do next."
- 3) "It's too hard to understand."
- 4) "I didn't think I needed to."
- 5) "I never have enough time."

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concludes that 10 percent of passenger vehicles made in the United States will have navigation systems by 1995.

GM has exclusive rights among U.S. auto companies to put the Etak system into new cars. Even so, the automobile giant is cagey about its plans. "We do not have any firm introduction plans," says Moretti. "Technologically, there's nothing preventing us from putting out a system. The biggest hurdle is cost."

If the history of other electronic gadgets is any indication, the costs of navigation systems will drop. Typically, competition and rising demand force down the prices of computer gear. For navigation systems, both are coming.

Competition may come from NEC Home Electronics of Wood Dale, Illinois, a division of Japan's NEC Corporation. NEC has shown a navigation system that, like the Etak Navigator, senses the motion of the car. Unlike the Etak system, however, the NEC system correlates its dead-reckoning position with readings taken from satellites.

Because it promises greater precision, satellite navigation is widely considered the wave of the future. Satellite systems

pinpoint location by measuring the time it takes a radio signal to travel from a car to two satellites. Using these data, a computer figures the distance from the car to each satellite, and then performs triangulation to locate the vehicle.

For now, however, satellite navigation is impractical. The necessary receiver/transmitter would make satellite-based systems much too costly for most consumers. Furthermore, neither military nor commercial navigation satellites are fully in place; space-program snafus keep delaying their deployment.

Another promising approach to path-finding comes from Navigation Technologies of Sunnyvale, California. Its CD-ROM maps store more detail than Etak's, including such features as the number of lanes on a road. Navigation Technologies uses this greater detail to compute and display verbal directions to a destination, much as a gas station attendant would, instead of displaying a map. Spokeswoman Michelle Schmidt says such systems should be available for use in cars by the early 1990s. At the moment the company offers its Countertop DriverGuide to car rental agen-

cies, hotels, and other businesses that people depend on for directions.

Demand for navigation systems is expected to come first from fleets—everything from taxi and trucking companies to police departments. Navigators can be linked by radio to a dispatcher at fleet headquarters, so the boss knows the location of all the cars in the fleet at all times. Growing commercial demand should push down prices.

But many drivers may not wait for lower prices, if an upcoming test in Los Angeles proves successful. The Federal Highway Administration, the California Department of Transportation, and General Motors plan a joint test of navigator-equipped cars that have special receivers to pick up traffic reports. "This would let people avoid the congestion," says Honey. That alone may make navigation systems worthwhile to many. Some drivers will pay anything to find their way out of the labyrinth more quickly. ■

Jeffrey Zygmunt is a freelance writer and former assistant managing editor of High Technology Business.

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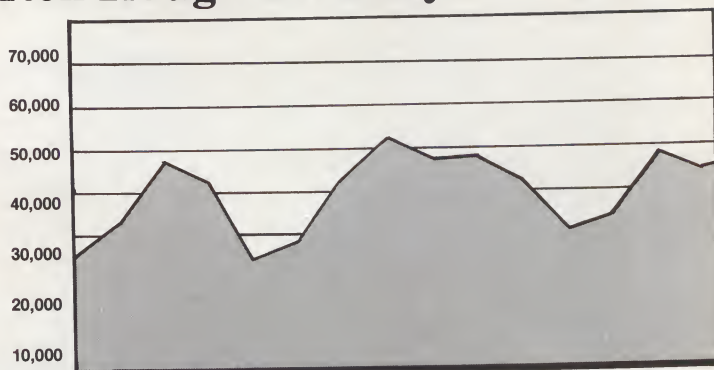
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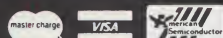
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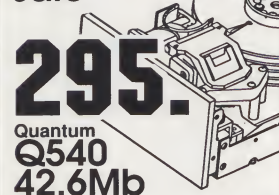
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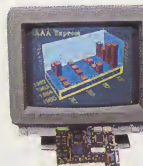
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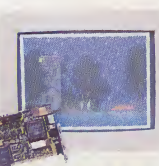
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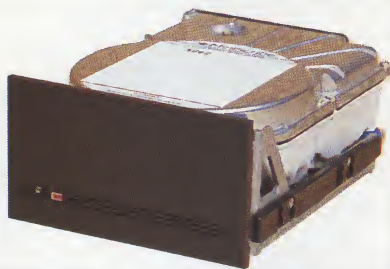
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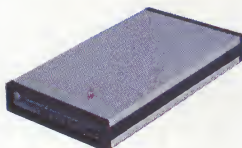
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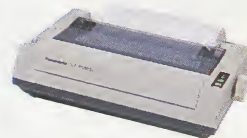
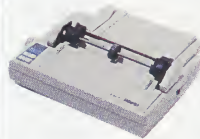
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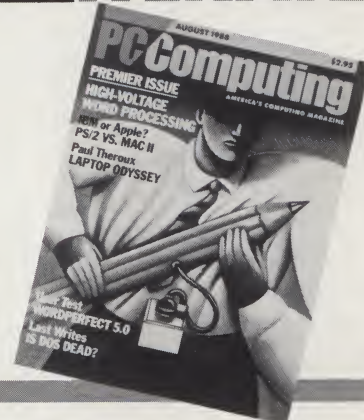
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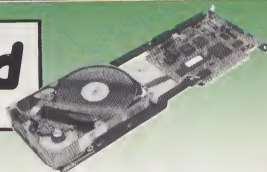
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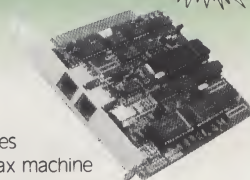
*Average access speed per partition

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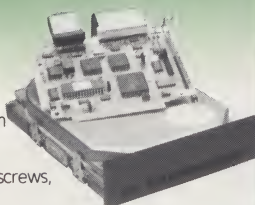
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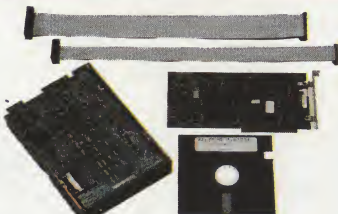
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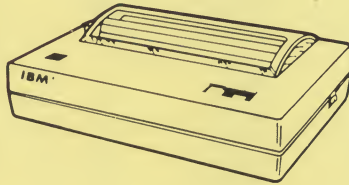
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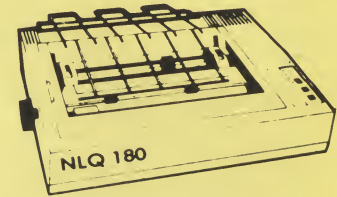
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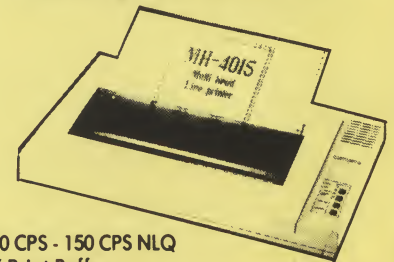
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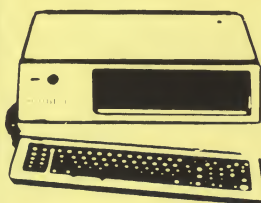


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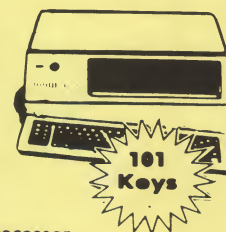
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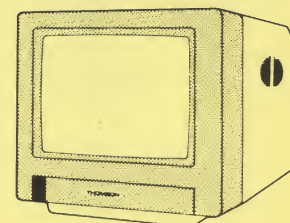
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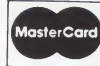
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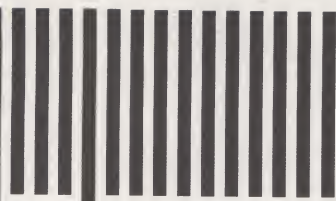
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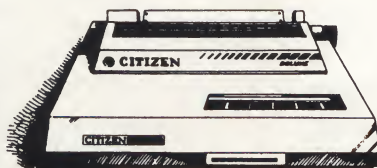
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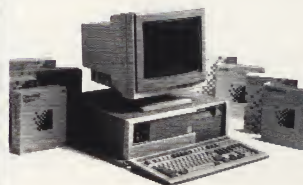
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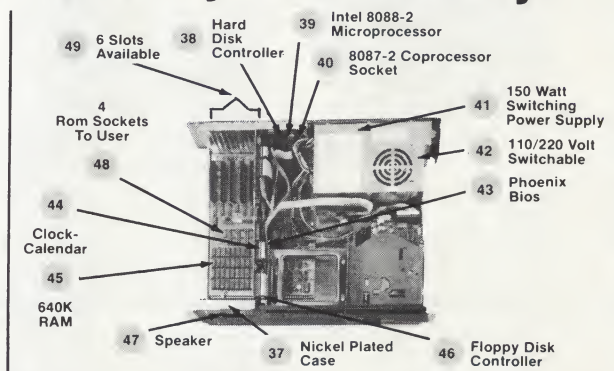
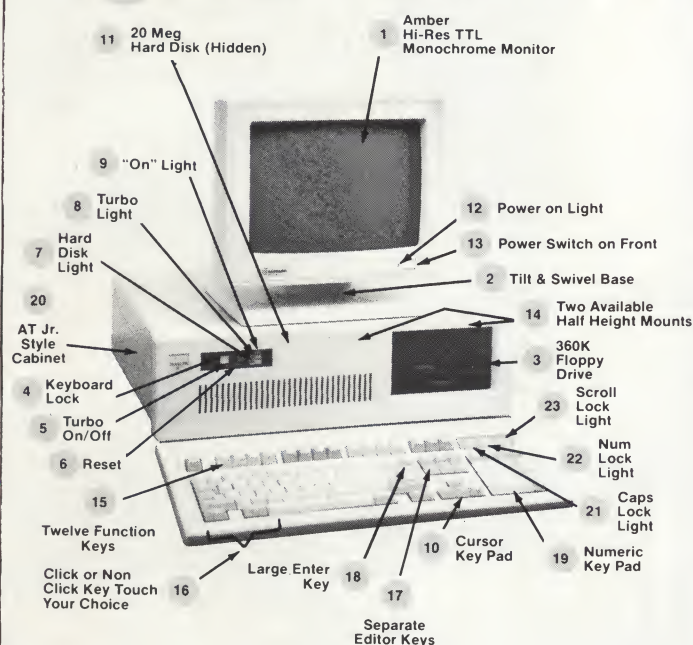
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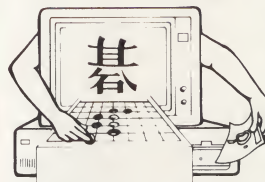
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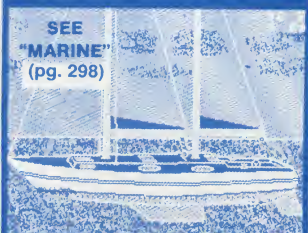
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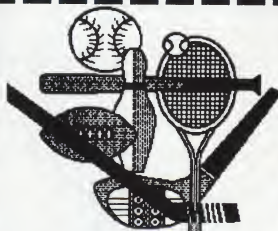
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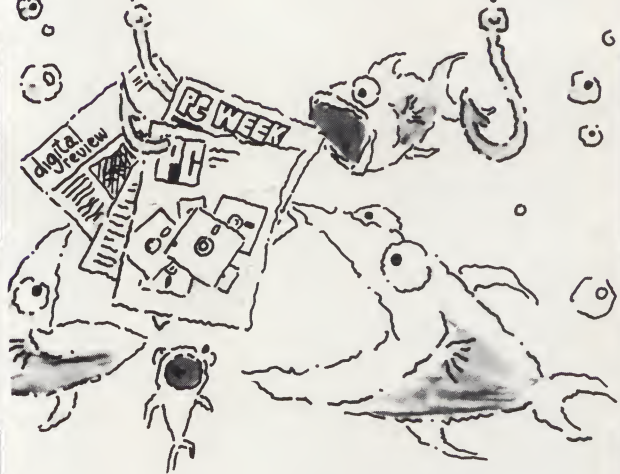
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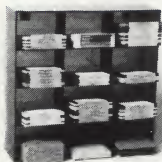
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3 Please estimate the total number of hours you spend on a computer per week (check one only):

- g ☐ 5 or less i ☐ 10-20
h ☐ 5-10 j ☐ 20 or more

4 What kind of computers do you currently use (check all that apply):

- k ☐ IBM/Compatible
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5 Do you plan to buy any of the hardware or software mentioned below in the next 12 months (check all that apply):

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- p ☐ PC
q ☐ Printer/Plotter
r ☐ Monitor
s ☐ Disk/Tape Back-up
t ☐ Add-in Board
u ☐ Communications

Software

- v ☐ Accounting
w ☐ Spreadsheet/Financial Planner
x ☐ Product Managers
y ☐ Word Processors
z ☐ Database Managers
1 ☐ Graphics
2 ☐ CAD/CAM
3 ☐ Communications

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Software

- v ☐ Accounting
w ☐ Spreadsheet/Financial Planner
x ☐ Product Managers
y ☐ Word Processors
z ☐ Database Managers
1 ☐ Graphics
2 ☐ CAD/CAM
3 ☐ Communications

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Lucid 3-D™ is the best spreadsheet you can buy.

Don't take our word for it. Use Lucid 3-D for 60 days. Return it for a full refund if not completely satisfied. Plus, instead of the \$199 list price, an introductory spread-the-word price of \$149.



Winner of
PC Magazine's
1987 Award
for Technical
Excellence

Lucid 3-D is priced to sell at \$199, but we want thousands of people using Lucid everyday, all over the world. We invite you to be a part of that group. The reason we are offering Lucid for only \$149, on a sixty day return for a full refund, is simple. Preliminary user testing of the product produces the same results over and over. People tell us they would never work without Lucid 3-D again. Even folks continuing to work with 1-2-3.

Memory Resident

That's because the idea of a memory resident spreadsheet makes sense, one that you can pop-up instantly while working in your word processor or any other program. Lucid lets you cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You

can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

Lucid 3-D was developed over the past two years with countless, exhaustive hours of planning and programming to produce something spectacular. This is a product that works the way we dreamed a spreadsheet would function. Everyone who has seen it says things like, "Lucid 3-D is how software of the 1990's will look and perform", or even more to the point "This is the way I thought a computer should work". You'll see, Lucid is exciting.

Masterwork

We could go on at great length about all the features and innovations in Lucid, but Lucid is more than a bag of features. What is most important is the pride and craftsmanship that went into its creation. It is a masterwork. The overall feel is tight and polished. In fact Paul, Somerson, editorial director of *PC Computing*, used one word to describe it, "Slick".

PCSG has built a reputation as a development laboratory producing products that you know are excellent. In 1983 PCSG dominated the Model 100 laptop market with ROM based software that every reviewer rated as



POP-UP 3 DIMENSIONAL SPREADSHEET

excellent. In 1985 we produced Lightning, the pioneer and award winning Disk speed up software. In 1986 we developed the Breakthru 286 accelerator board that blew everything else out of the water, and later we topped ourselves with the Breakthru 12. Now in 1988 those who have worked with Lucid 3-D tell us "you have done it again. This is software everyone should have."

For a limited time

\$149

Lucid™
3-D

1-800-544-4699

CIRCLE NO. 144 ON READER SERVICE CARD.

Complete other spreadsheet with a single key.

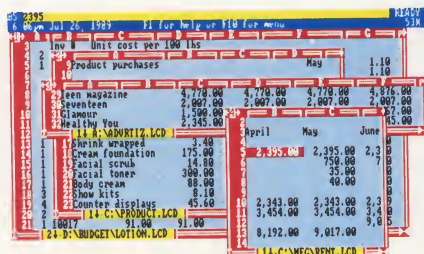


Fig. 5 Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different directories, different drives, even down as many 3-D levels as you like. No one else can do that.

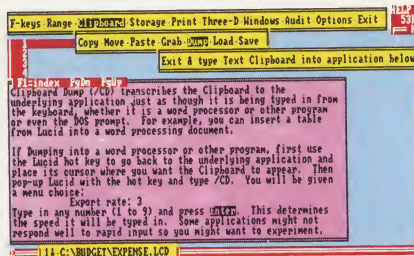


Fig. 6 We need those budget figures in the Word Perfect letter we are writing. Clipboard Dump does it right now.



Fig. 7 Here it is right in Word Perfect (or any word processor) just like you typed it. You can go the other way just as easily.

you can make your custom menus work like Lucid where one choice can take you down a level to a whole new set of choices. What's nice is that they will work from one spreadsheet to another.

Mouseability

Lucid 3-D was designed for both keyboard enthusiasts and mouse lovers alike. You can take your pick. Designed around the mouse from the ground up, the interface is smooth and natural. You select files to load from directory lists. Everything is point and click. What's more, any Lucid 3-D menu selection can be "moused" and the response time is "right now" instead of the sluggish "a little bit behind you" feel of add-on mouse menu systems like those you've seen with 1-2-3.

A window pops up with a library of function names you can page through with the mouse. Select, click and it's in the formula with no typing required. You even have a label window that you can fill (from the keyboard) with favorite labels and names so that you can insert them later with the mouse. There's even a pop-up calculator to insert numbers so you don't have to go to the keyboard very often.

It really permits that feeling of becoming one with your work. Lucid

3-D has windows of user defined range names as well as the macros named by the user that can be selected just by pointing and clicking. Icons that are easy to grab with the mouse let you resize and move the spreadsheet window with the ease you would expect. Plus you can go anywhere on the sheet by moving the mouse and clicking on the spreadsheet borders. And remember, Lucid is designed so that any of those features are done with or without the mouse easily and quickly.

Audit

When you are staking a big decision on information gained from a spreadsheet you need to be certain that you have made no mistakes. Lucid 3-D offers five audit displays and printouts.

Even if you don't plan to abandon 1-2-3, Lucid makes sense. Files are converted between them with ease so there's not an interoffice compatibility problem. This means you can have the power and fun of Lucid 3-D without having to upset your present systems.

We are excited about Lucid 3-D. But don't take our word for it, take us up on our 60 day offer.

Call us on our order line number and we will ship your order the very next day. This \$149 offer will end as soon as our dealer network is fully stocked. But in the mean time we invite you to try Lucid as part of our "spread the news" campaign. Just pick up the phone and call us. We accept all major credit cards or you can order COD.

LucidTM

3-D

Ask your dealer or
call
1-800-544-4699
or 214-404-4000



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Any cell can contain a command that you can access

Aggregate expenses for all departments for July 1989:	
Advertising	152,394.00
Administrative	232,302.00
Operations	232,645.00
Manufacturing	232,501.00
Research and development	232,644.00
Total expenses	1,180,585.00

Fig. 1 Let's get the detail on those ad costs. Just move the widebar to that cell and press one key (Grey +).

Advertising July 1989	
Magazines	152,394.00
Newspapers	97,950.00
TV & Radio	123,876.00
Skywriting	97,654.00
Total	473,923.00

Fig. 2 Here we are, instantly. Notice the lower left corner showing we are on level 2. You can go down or up.

Advertising July 1989	
Magazines	152,394.00
Newspapers	97,950.00
TV & Radio	123,876.00
Skywriting	97,654.00
Total	473,923.00

Fig. 3 We want more detail, so let's go to News - papers. Just press the Grey + key.

Newspapers July 1989	
Washington Post	21,966.00
Dallas Morning News	14,886.00
New York Times	14,886.00
Chicago Tribune	17,654.00
Miami Herald	9,576.00
Los Angeles Times	11,950.00
Total	97,950.00

Fig. 4 Now, instantly we are on level 3. Each level is a different spreadsheet. You could now move to the New York Times and see the detail on that figure. There is no limit to the levels you can go. Move right down to transaction level if you like.

What Makes Lucid 3-D So Special
In the screen examples you can see Lucid is really three dimensional. Any cell of the spreadsheet can contain a complete other spreadsheet that you can access with a single keystroke. It is as simple as the pictures show. And you don't have to write formulas to do that.

All you do is go look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid works that way. Users say "It is so intuitive that I really don't need a manual." That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said that, "If there ever was an interface idea so good it ought to be stolen and widely used, this is it."

What he was talking about is a new menu approach that follows a simple design concept: it is easier to recognize than it is to remember. As choices are made on a menu that take you to lower levels you always can see exactly where you came from and where you are going. The complete menu path is always visible. You cannot get lost several levels down. This means you never have to remember a command, you just flow right to it.

Plus, no matter where you are on a menu or what you are doing, just press function key F1, and you will get a help screen specific to that command or action. Or if you want to know about any subject you can pop up an index of over 600 topics and select the one you want.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

"I've been calling it an 'Everyman's Spreadsheet', and I think that's how the market will position it. It's much more than an inexpensive alternative to 1-2-3."

Jim Seymour, Columnist, PC Magazine, PC Week

Speed

Lucid 3-D is truly revolutionary. It is fast, fast, fast! It is incredibly quick in performing calculations because it doesn't recalculate every cell every time you insert an entry. Instead, it only recalculates the specific cells that are affected by your change. This is called minimal recalc. Lucid also has a remarkable innovation called background recalc in which you are given control of the cursor the moment calculations affecting your viewing

screen are completed. Other calculations you don't see continue on in the background during the next commands. The end result of this powerful combination is you rarely wait for a recalculation with Lucid. You find out what instantaneous is all about.

Lucid Learns

Lucid 3-D also lets you teach it in any combinations of keystrokes so that involved sequences can be done with single keys. Plus more than just remembering keystrokes, Lucid allows you to create Macros with loops, procedures and conditional branching amazingly all done automatically with simple menus. You can create your own menus that show the new features you have taught it. Another great feature is

LucidTM

3-D

ADUER.LCD.D13
10:49am May 26, 1989
F1 for help or F10 for menu

Aggregate expenses for all departments for July 1989:

Advertising	\$236,382.00
Administrative	\$387,645.00
Operations	\$632,591.00
Manufacturing	\$158,044.00
Research and development	
Total expenses	\$1,656,191.00

21 C:\BUDGET\EXPENSE.LCD

Advertising July 1989

Magazines	\$23,876.00
Newspapers	\$9,999.00
TV & Radio	\$23,876.00
Skywriting	\$45,260.00
Total	\$321,529.00

24 C:\BUDGET\ADVER.LCD

Inc Magazine

Business Week	\$1,100.00
Money Magazine	\$1,100.00
Economist	\$1,100.00
Harpers	\$1,100.00
Forbes	\$1,100.00
Total	\$5,500.00

21 C:\BUDGET\MAGAZ.LCD

21 C:\BUDGET\MAGAZ.LCD

Magazines	\$1,100.00
Newspapers	\$1,100.00
TV & Radio	\$1,100.00
Skywriting	\$1,100.00
Total	\$4,400.00

1987
Winner of PC Magazine's
Award for Technical Excellence



You'll love it.